ORDER NO. HAD84122364C9

# Service Manual

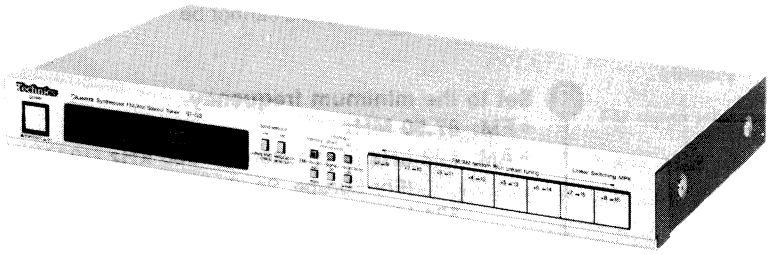
Tuner

## ST-G3

QUARTZ Synthesizer
FM/AM Stereo Tuner

**Color**

(S)...Silver Type
(K)...Black Type



| Color | Area |
|---|---|
| (S) (K) | [EX]...Switzerland and Scandinavia. |
| (S) (K) | [EH]...Holland. |
| (S) (K) | [XA]...Asia, Latin America, Africa, Middle Near East and Oceania. |
| (S) (K) | [XL]...Australia. |
| (S) (K) | [PA]...Far East PX. |
| (S) (K) | [PE]...European Military. |
| (S) (K) | [PC]...European Audio Club. |

## SPECIFICATIONS

### (DIN 45 500)

#### ■ FM TUNER SECTION

| | |
|---|---|
| **Frequency range** | 87.50~108.00 MHz<br>87.525~108.00 MHz (+25 kHz shift) |
| **Sensitivity** | 0.95 μV (IHF, usable) |
| **S/N 30 dB** | 1.0 μV (75Ω) |
| **S/N 26 dB** | 0.9 μV (75Ω) |
| **S/N 20 dB** | 0.8 μV (75Ω) |
| **IHF 46 dB stereo quieting sensitivity** | 22 μV/75Ω |
| **Total harmonic distortion** | |
| **MONO** | 0.09% |
| **STEREO** | 0.2% |
| **S/N** | |
| **MONO** | 70 dB (76 dB, IHF) |
| **STEREO** | 65 dB (71 dB, IHF) |
| **Frequency response** | 4 Hz~18 kHz, +0.5 dB~ −1.5 dB |
| **Alternate channel selectivity** | |
| **normal ±400 kHz** | 65 dB |
| **Capture ratio** | 1.0 dB |
| **Image rejection at 98 MHz** | 55 dB |
| **IF rejection at 98 MHz** | 90 dB |
| **Spurious response rejection at 98 MHz** | 80 dB |
| **AM suppression** | 55 dB |
| **Stereo separation** | |
| **1 kHz** | 50 dB |
| **10 kHz** | 40 dB |
| **Carrier leak** | |
| **19 kHz** | −65 dB (−70 dB, IHF) |
| **38 kHz** | −45 dB (−50 dB, IHF) |
| **Channel balance (250 Hz~6,300 Hz)** | ±1.0 dB |
| **Limiting point** | 0.75 μV |
| **Bandwidth** | |
| **IF amplifier** | 180 kHz |
| **FM demodulator** | 1000 kHz |
| **Antenna terminals** | 75Ω (unbalanced) |

#### ■ AM TUNER SECTION

| | |
|---|---|
| **Frequency range** | |
| **(For Europe, South Africa and Australia)** | |
| | 522~1611 kHz (9 kHz-step) |
| | 530~1610 kHz (10 kHz-step) |
| **(For Saudi Arabia and others)** | |
| | 531~1610 kHz (9 kHz-step) |
| | 530~1610 kHz (10 kHz-step) |
| **Sensitivity (S/N 20 dB)** | 20 μV, 290 μV/m |
| **Selectivity (±9 kHz)** | 55 dB |
| **Image rejection at 999 kHz** | 40 dB |
| **IF rejection at 999 kHz** | 60 dB |

#### ■ GENERAL

| | |
|---|---|
| **Output voltage** | 0.3V (0.6 V IHF) |
| **Power consumption** | 9W |
| **Power supply** | |
| **For Australia** | AC 50 Hz/60 Hz, 240V |
| **For continental Europe** | AC 50 Hz/60 Hz, 220V |
| **For others** | AC 50 Hz/60 Hz, 110V/127V/220V/240V |
| **Dimensions (W×H×D)** | 430 × 53 × 245 mm<br>(16-30/32" × 2-3/32" × 9-21/32") |
| **Weight** | 2.2 kg<br>(4.8 lb.) |

**Note:**
Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

Specifications are subject to change without notic for further improvement.

Technics

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**Panasonic Tokyo**
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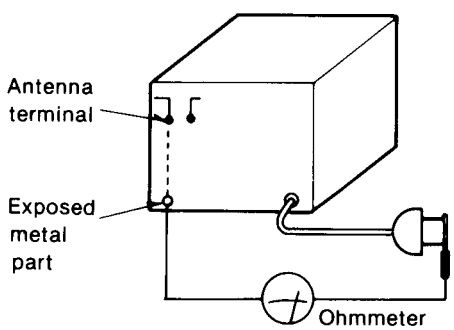
# ■ SAFETY PRECAUTION

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

## • INSULATION RESISTANCE TEST

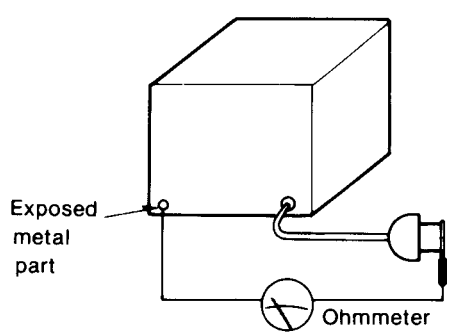
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

**Note:** Some exposed parts may be isolated from the chassis by design. These will read infinity.




(Fig. A)

Resistance = 3MΩ—5.2MΩ

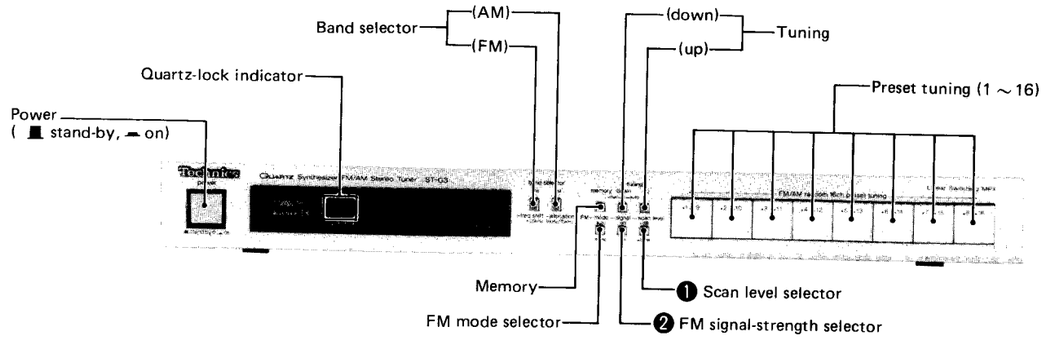



(Fig. B)

Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

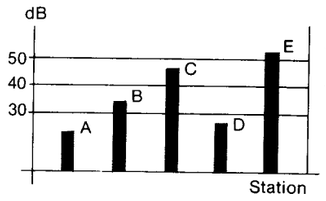
## ■ LOCATION OF CONTROLS




### ❶ Scan level selector (scan level)

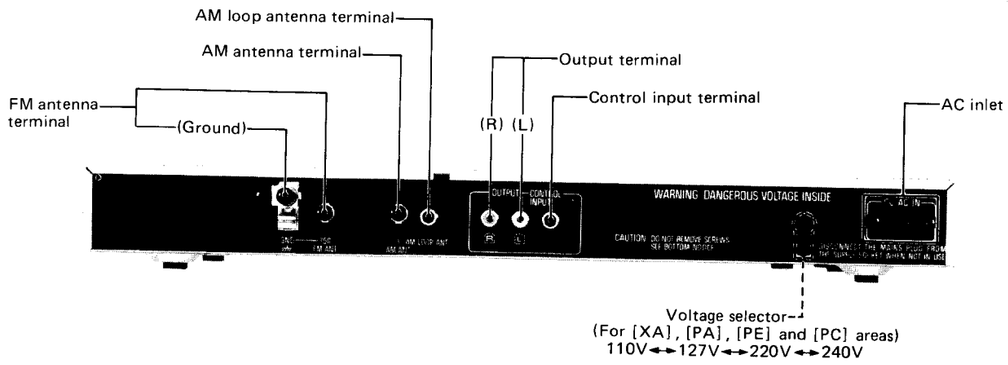
This button is used for the setting of the level of the reception signal during automatic FM tuning.
When this button is pressed continuously, numerals (30, 40, 50) will appear in the digital display; release the button at the desired display.
After the desired scan level has been selected, it will then be possible to tune to and receive broadcasts of this level or higher, and to enter (into the memory) stations with high levels.

- **Example if set to the 40-dB level (applicable to automatic tuning only)**




### ❷ FM siganl-strength selector (signal)

When this button is pressed, the signal strength of the FM broadcast being received will be indicated.
The signal strength is indicated in 2-dB steps. At about 50 dB, there is no noise, and sound is clear. (The signal becomes saturated at about 54 dB.)
If the strength of the signal being received is 50 dB or more, a symbol (■) will appear between the number and dB to indicate that a strong signal of 50 dB or more is being received.
In order to resume the frequency display, press the button once again.






## ■ HOW TO PRESET RADIO BROADCAST FREQUENCIES

This unit can be used to preset as many as 16 radio broadcast frequencies: FM/AM random presetting. After broadcast frequencies have been preset as described below, any desired station can be quickly and easily selected by simply touching one button.

**Important!**

If this antenna is not installed, AM broadcasts will not be received.

### ■ Memory presetting

There are two types of memory presetting: automatic and manual. Select whichever is preferred.

### • Automatic memory presetting

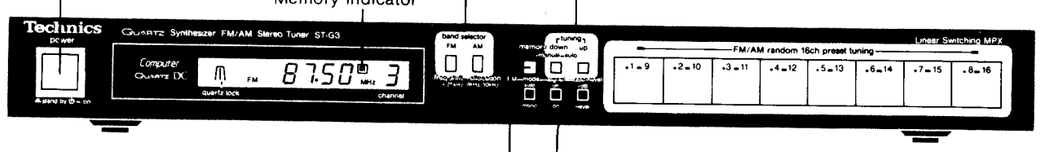
Beginning at the frequency indicated by the digital display, the FM broadcasting stations and AM broadcasting stations will be automatically preset to "channels" 1 through 16 for FM and 9 through 16 for AM, respectively.
Note that in mountainous or remote areas, broadcasting stations which have weak broadcasting signals cannot be automatically preset into the memory.

**❷ Press the "FM" or "AM" button.**

Before presetting AM broadcasting stations, press the AM band selector to the appropriate position for your locality.

**❶ Power: "on" ( ■→▬ )**

Memory indicator



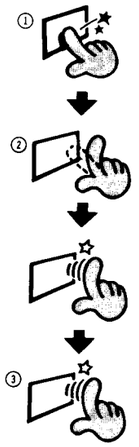

**❸ Set to the minimum frequency.**

- **FM: 87.50 MHz**
- **AM: 522 kHz** (9 kHz step) **or 530 kHz** (10 kHz step)
  (For Europe, South Africa and Australia)
  **531 kHz or 530 kHz**
  (For Saudi Arabia and others)

**Tuning**

Press the left button to change the frequency downward, and press the right button to change the frequency upward.

① Press the button and hold slightly (frequency will change continuously).
② Release it at 87.50 MHz for FM or 522 kHz (or 530 kHz) for AM, and then press the button again momentarily (frequency change will stop).
③ Press the button momentarily (frequency will change each time the button is pressed), and tune to one of the above frequencies.




**Note:**
For AM broadcasts with extremely strong signal transmissions,the frequency memorized may be slightly off of the correct frequency. If this occurs, use the manual control to memorize.

**❹ Press. When the memory indication illumination stops, release.**

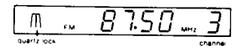
(The frequency will change upward, and the automatic presetting will begin with the broadcasting station of the lowest frequency and will continue in order.)

❺ Confirm the names (call signs, etc.) of the broadcasting stations which are preset to each channel, and enter them on the file sheet

**To check the front channels (CH1~8):**

Press momentarily.

→

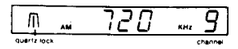



Frequency stored in the memory and channel number are displayed.

**To check the back channels (CH 9~16):**

Press slightly longer.

→




Frequency stored in the memory and channel number are displayed.

## • Manual memory presetting

Stations can be freely preset to any desired channel.

**1 Power: "on" ( ■→▬ )**

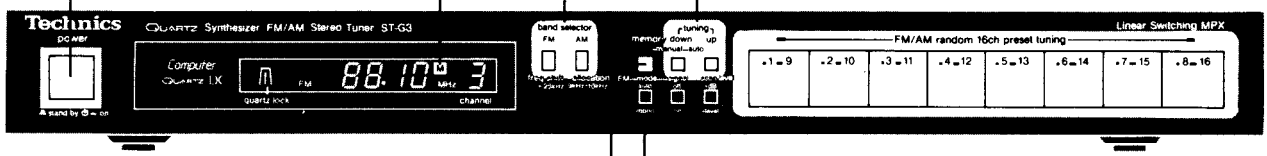
**2 Press the "FM" or "AM" button.**
Before presetting broadcasting stations, press the band selectors to the appropriate position for your locality.

**3 Press the appropriate tuning button to tune to the desired broadcast.**

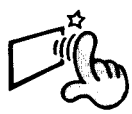
- **Auto tuning**
  Press the button. When the frequency indication begins to change, release the button (a broadcasting station will be selected automatically). Repeat this operation until the desired station is found.

- **Manual tuning**
  Press the button momentarily (the frequency will change each time the button is pressed) and tune to the desired station.

Memory indicator




**4 Press momentarily, and then release.**
(The memory indicator will illuminate for approximately 5 seconds.)



**Note:**
If the button is pressed continuously, the frequency will begin to change, and the memory will be preset automatically.
In order to stop the automatic selection, press either the "up" button or the "down" button.

**5 While the memory indicator is illuminated, press the button of the desired channel.**

- **To preset channels 1 through 8:**

Press the button momentarily, and then release. (Preset channel number is displayed on the channel display.)

- **To preset channels 9 through 16:**

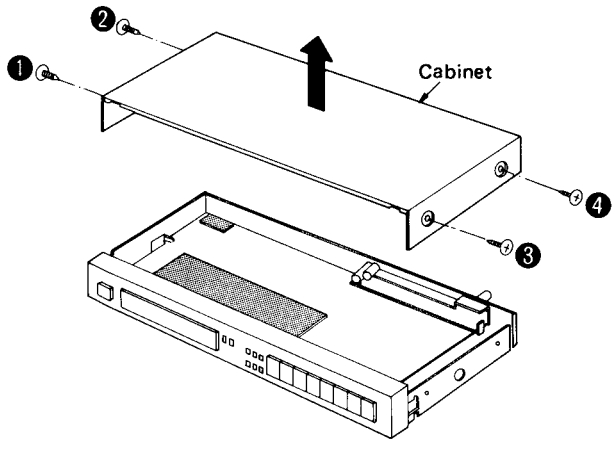
Press the button slightly longer, and then release. (Preset channel number is displayed on the channel display.)

When the button is pressed, the memory indicator illumination will stop, and the presetting is complete.

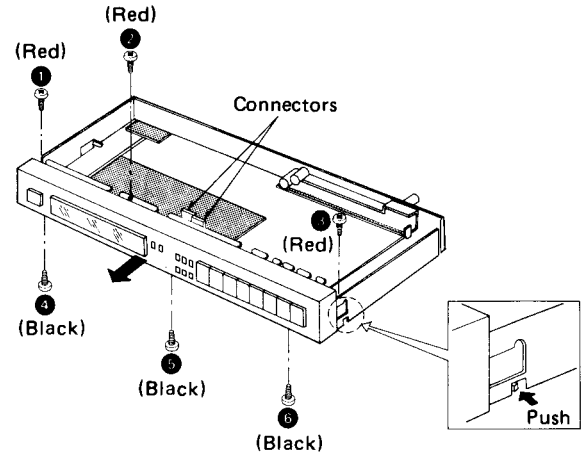
**Note:**
1. If the memory indication illumination stops before you press the button, once again repeat step (4) and then step (5).
2. If a new broadcasting station is preset into a channel, the broadcasting station which was previously entered in that channel will be automatically erased.

# ■ DISASSEMBLY INSTRUCTIONS

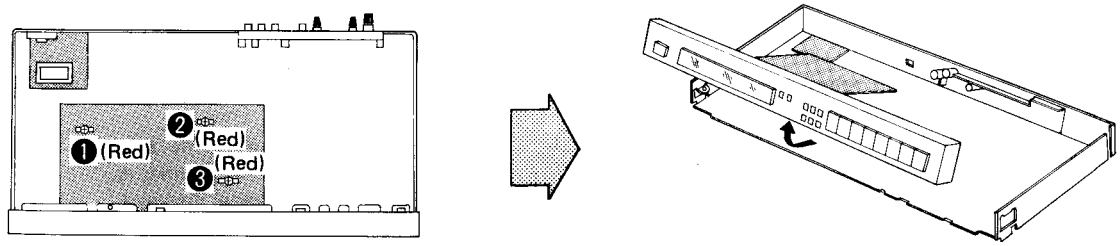
| Ref. No. 1 | How to remove the cabinet |
|---|---|
| Procedure 1 | • Remove the 4 screws ( ❶ ~ ❹ ) |



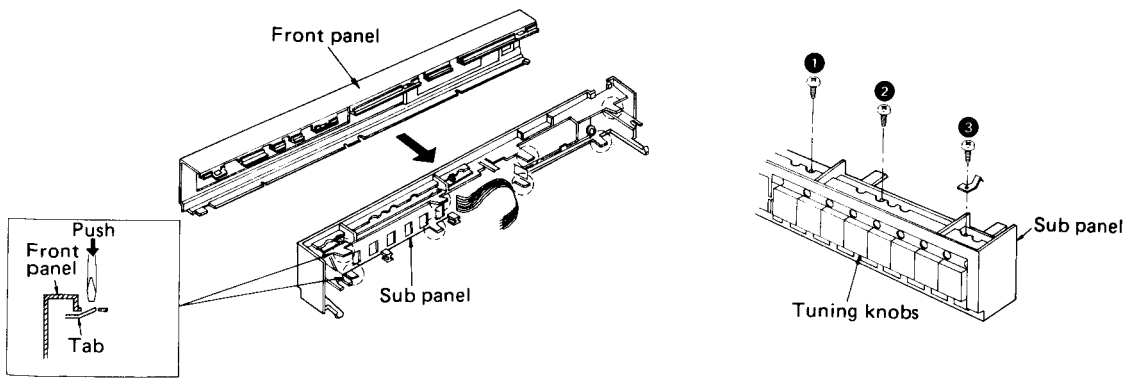

| Ref. No. 2 | How to remove the front panel |
|---|---|
| Procedure 1 → 2 | • Remove the 6 screws ( ❶ ~ ❻ ) |




| Ref. No. 3 | How to remove the main P.C.B. |
|---|---|
| Procedure 1 → 2 → 3 | • Remove the 3 screws ( ❶ ~ ❸ )<br>• Slightly pull the front panel toward you and remove the main P.C.B. |




| Ref. No. 4 | How to remove the front sub-panel and tuning knobs |
|---|---|
| Procedure 1 → 2 → 4 | • Push the 8 tabs aside<br>• Remove the 3 screws ( ❶ ~ ❸ ) |



# ■ MEASUREMENTS AND ADJUSTMENTS

## ■ AM/FM

**Control positions and equipment used**

- AM and FM signal generator (AM and FM-SG).
- Stereo modulator
- Distortion analyser
- Oscilloscope
- AC and DC electronic voltmeter (EVM)
- Frequency counter
- Choke coil (100μH)
- Resistor (100kΩ)
- Ceramic capacitor (200pF)

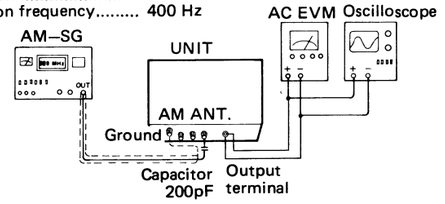
**Note:** For T201 (AM-IFT) and L203 (AM OSC coil), adjusted parts are supplied. So, do not turn the cores of these parts.

### AM-RF ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "**AM**" position.
3. Place the radio frequency display and signal generator setting to **612 kHz**.
4. Adjust **L202** for maximum output.
5. Place the radio frequency display and signal generator setting to **1503 kHz**.
6. Adjust **CT201** for maximum output.
7. Repeat steps 3 ~ 6.

**Note:** Antenna input level must be as low as possible being free from AGC.

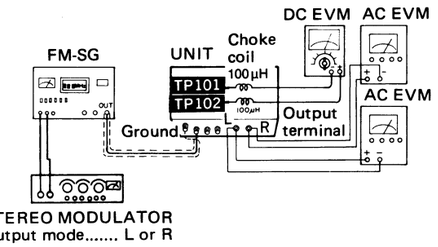
AM SIGNAL GENERATOR CONDITION
Modulation ..... 30%
Modulation frequency..... 400 Hz




### FM MONO DISTORTION ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "**FM**" position.
3. Place the radio frequency display and signal generator setting to **100.10 MHz**.
4. Adjust **T101** core so that voltage measured in signal mode is **0 mV (0 ± 50 mV)** in **300 mV** range.
5. Set the output mode of stereo modulation to "**L**" or "**R**"
6. Adjust **T102** so that "**L**" channel ("**R**" channel) is minimized.
7. Repeat steps 4 ~ 6, and make sure that the distortion is nearly same between "**L**" and "**R**" channels and is less than **4%**.

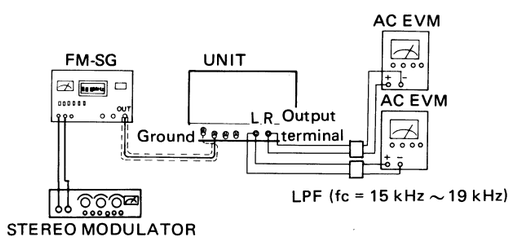
FM SIGNAL GENERATOR CONDITION
Modulation..... 100%
Modulation frequency..... 400 Hz
Output level..... 66 dB




### SEPARATION ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "**FM**" position.
3. Place the radio frequency display and signal generator setting to **100.10 MHz**.
4. Adjust **VR301** so that R output is minimized when stereo modulator is in "**L**" (L ch modulation) mode.
5. The mode must be "**R**" for "**R**" channel; and L → R, R → L separation must be **40 dB** at least.

FM SIGNAL GENERATOR CONDITION
Modulation ..... "L" mode or "R" mode 90%, Pilot 10%
Modulation frequency..... 1 kHz, Pilot (19 kHz)
Output level..... 66 dB

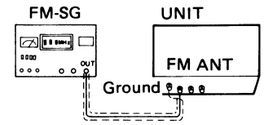




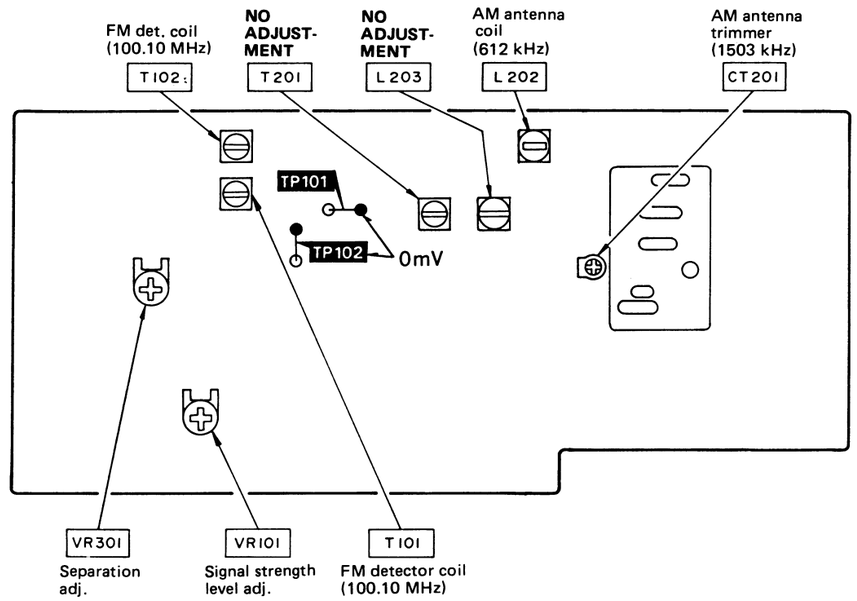

### SIGNAL STRENGTH LEVEL ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "**FM**" position.
3. Place the radio frequency display and signal generator setting to **100.10 MHz**.
4. Change **LCD** display from frequency to **dB** by pressing the **FM** signal button.
5. Adjust **VR101** so that **54 dB** in indicated.
6. Make sure that the signal strength level is **22 ~ 38 dB** when the input is **30 dB**.

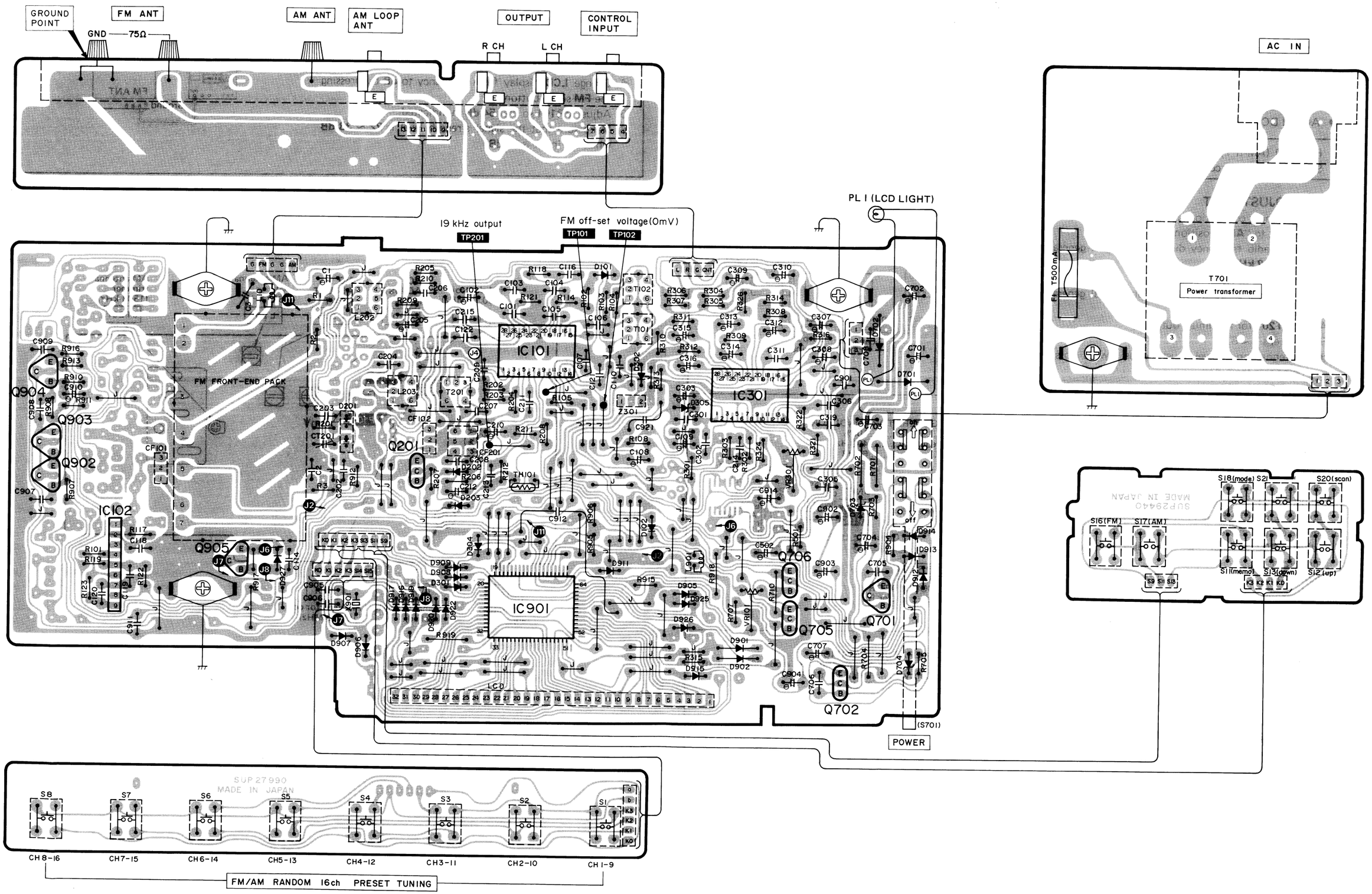
FM SIGNAL GENERATOR CONDITION
Modulation..... 30%
Modulation frequency..... 400Hz
Output level..... 60 dB




- **Adjustment points**

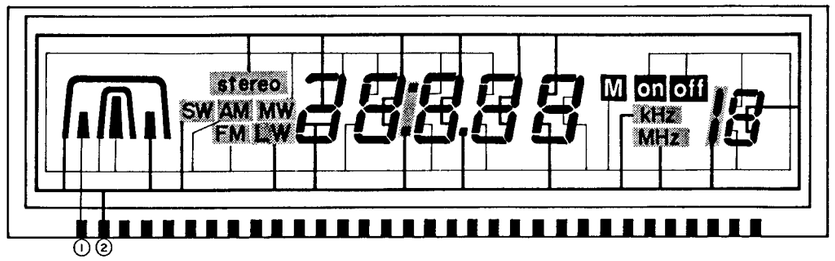


## ■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

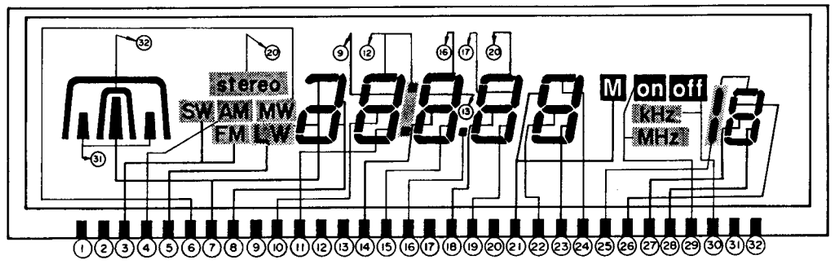


## ■ DESCRIPTION OF LCD PANEL

- **COMMON**




- **SEGMENT**




| IC901 pin No. | 57 | 56 | 55 | 54 | — | 57 | 53 | 52 | 51 | 50 | 49 | 48 | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 40 | 39 | 38 | 37 | 36 | 35 | 34 | 33 | 32 | 31 | 30 | 29 | 28 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**< Segment ON >**

Pin ① or ② of LCD and each segment terminal.



2V AC/DIV, 5m sec/cm

**< Segment OFF >**

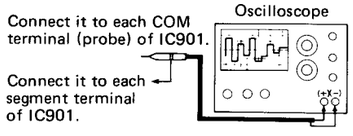
Pin ① or ② of LCD and each segment terminal.



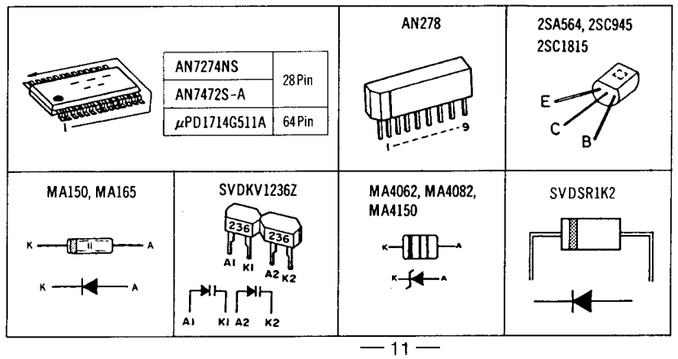
2V AC/DIV, 5m sec/cm

- **Each segment waveform measuring method**

**Note:** Potential difference from COM terminal waveform is measured for each segment output waveform. So, do not connect the earth to other equipment on the oscilloscope side.
If the earth is connected, IC901 will break down.




## ■ TERMINAL GUIDE OF TRANSISTORS, IC'S AND DIODES

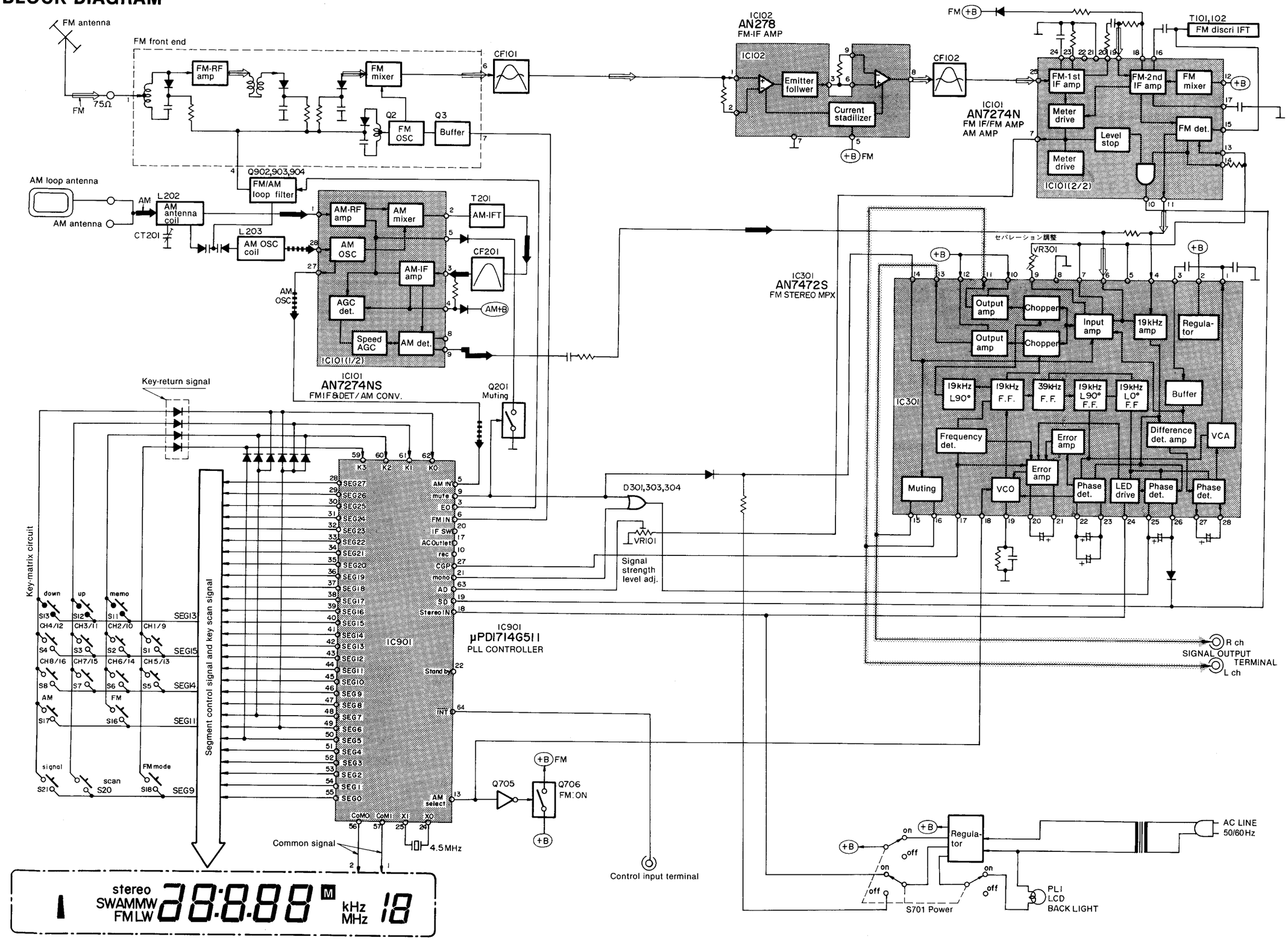


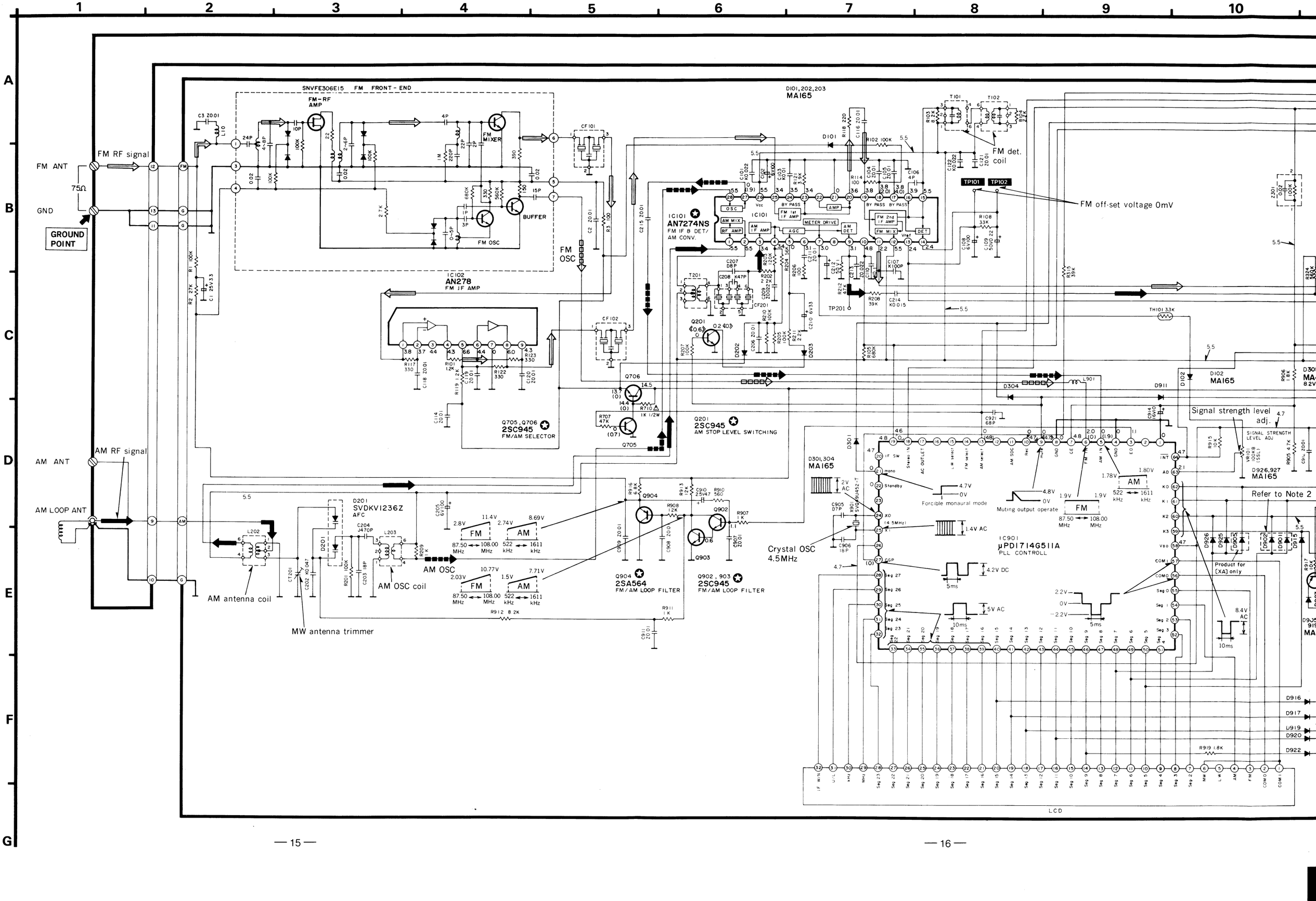


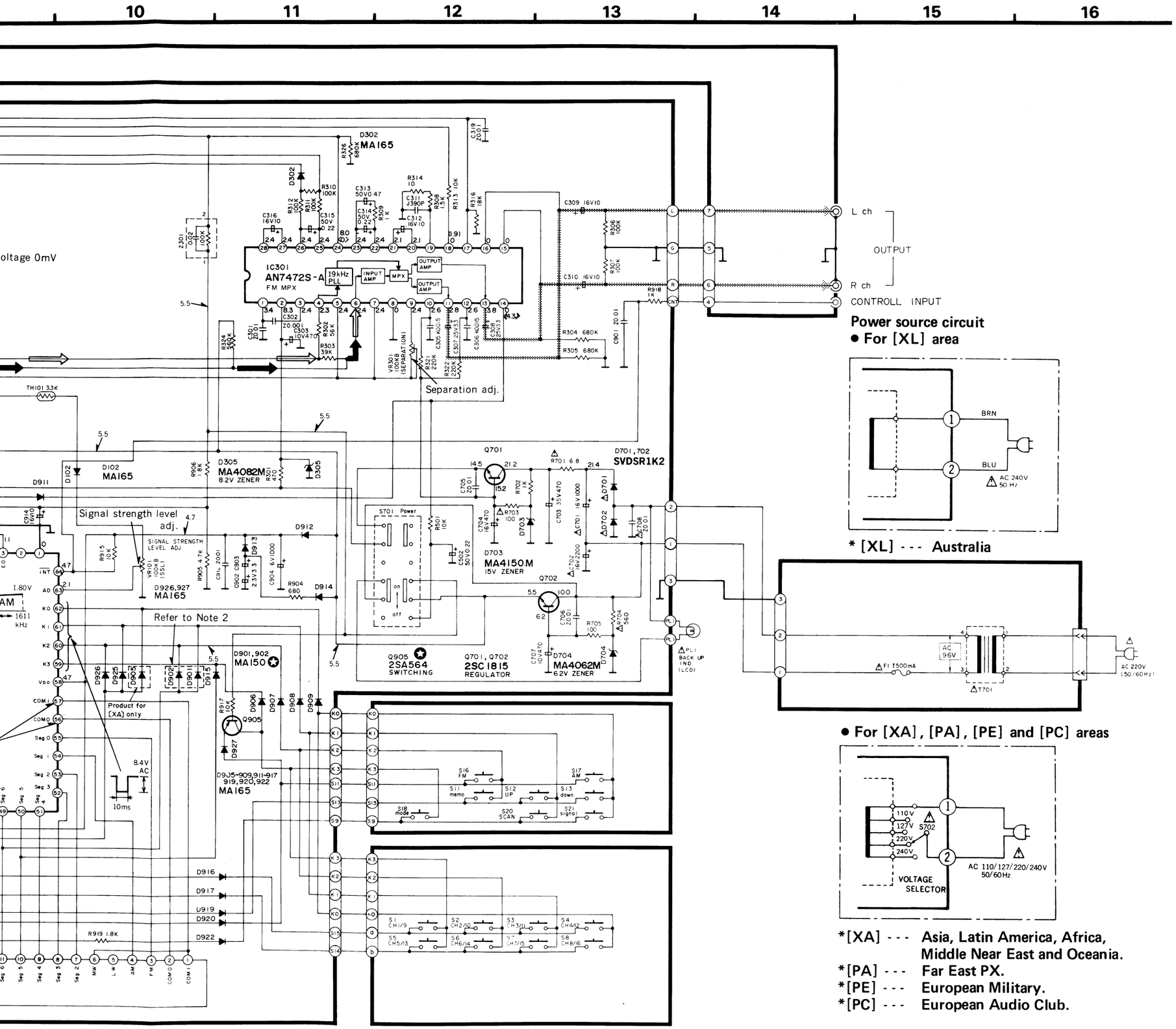

## ■ FUNCTION OF TERMINAL (IC901: μPD1714G511)

| Pin No. | IN/OUT | Mark | Description of terminal |
|---|---|---|---|
| 1 | —— | NC | Ground terminal. |
| 2 | —— | EO1 | Not used in this unit. |
| 3 | OUTPUT | EO2 | The frequency is output as a result of comparison between LCD frequency and FM or AM station frequency. |
| 4 | —— | GND | Ground terminal. |
| 5 | INPUT | AM | Input for AM OSC output. 1.84V → 1.87V (522kHz → 1629kHz) |
| 6 | INPUT | FM | Input for FM OSC output frequency divided to 1/32 or 1/33 by pre-scaler. |
| 7 | INPUT | CE | Power supply detection. "H" input with it connected to home-use power outlet socket. H → 4V, L → 0V |
| 8 | —— | GND | Ground terminal. |
| 9 | OUTPUT | MUTE | This is the output terminal to eliminate shock noise due to unlocking at PLL. <Muting output> 1. Pin 7 (CE) is L → H or H → L. 2. Power switch "off". 3. Frequency change. (up/down, FM ↔ AM, REC). 4. FM IF selection. 4.8V / 0V Muting output operation |
| 10 | —— | REC | Not used in this unit. |
| 11 | —— | SDC | |
| 12 | —— | RFATT | |
| 13 | INPUT | AM | AM selector. H (4.8V) → AM |
| 14 | —— | FM | Not used in this unit. |
| 15 | —— | LW | |
| 16 | —— | SLEEP | |
| 17 | —— | POWER | |
| 18 | INPUT | STEREO | Stereo indicator drive. L (0) — Stereo indicator light up. |
| 19 | INPUT | SD | Station detection 1. Signal received → H (5V) 2. NO signal → L (0V) |
| 20 | —— | WIDE | Not used in this unit. |
| 21 | OUTPUT | MONO | Forcible monaural selection. 4.7V / 0V Forcible monaural mode |
| 22 | —— | STANDBY | Not used in this unit. |
| 23 | —— | SO | |
| 24 | OUTPUT | X OUT | Connecting terminal for crystal oscillator. The crystal connected is at 4.5 MHz. |
| 25 | INPUT | X IN | |
| 26 | INPUT | $V_{DD}$ | Power supply terminal. (4.7V) |
| 27 | OUTPUT | CGP | Clock pulse waveform output. |
| 28 ~ 39 | OUTPUT | S27 ~ S16 | Segment signal output for LCD display. |
| 40 ~ 55 | OUTPUT | S15 ~ S0 | Segment signal output and key source signal output for LCD display. LCD seg / KS / LCD seg / KS / LCD seg / KS; 333μs; 10ms; LCD seg : LCD display data; KS : Key source data |
| 56 | OUTPUT | COM 0 | Common of LCD. |
| 57 | | COM 1 | |
| 58 | INPUT | $V_{DD}$ | Power supply terminal. (4.7V) |
| 59 ~ 62 | INPUT | K3 ~ K0 | Input terminal for key return signal from external key matrix. |
| 63 | INPUT | SSL | Electromagnetic field intensity level input is changed from analog to digital. |
| 64 | INPUT | INT | Interrupt requesting signal input terminal. Signal from control input terminal is put into this terminal. Detected when input is "L". Band det. 125 msec, 625msec, 18msec, 580msec, 200msec, CH det. |

## ■ BLOCK DIAGRAM




SNVFE306E15 FM FRONT-END
FM-RF AMP
FM MIXER
BUFFER
FM OSC
FM RF signal
FM ANT
75Ω
GND
GROUND POINT
FM OSC
IC102
AN278
FM IF AMP
CF102
CF101
IC101
AN7274NS
FM IF & DET/ AM CONV.
D101, 202, 203
MA165
T101
T102
FM det. coil
TP101
TP102
FM off-set voltage 0mV
CF201
T201
Q201
2SC945
AM STOP LEVEL SWITCHING
Q705, Q706
2SC945
FM/AM SELECTOR
Q705
Q706
D201
SVDKV1236Z
AFC
AM OSC
AM OSC coil
AM antenna coil
MW antenna trimmer
AM RF signal
AM ANT
AM LOOP ANT
Q904
2SA564
FM/AM LOOP FILTER
Q902, 903
2SC945
FM/AM LOOP FILTER
D301, 304
MA165
IC901
μPD1714G51IA
PLL CONTROLL
Crystal OSC 4.5MHz
Forcible monaural mode
Muting output operate
Signal strength level adj.
SIGNAL STRENGTH LEVEL ADJ
D926, 927
MA165
Refer to Note 2
Product for [XA] only
LCD
AM
FM
1.80V
1.78V
522 ↔ 1611 kHz
87.50 ↔ 108.00 MHz
1.9V
4.8V
4.7V
0V
1.4V AC
4.2V DC
5V AC
8.4V AC
2.2V
-2.2V
5ms
10ms




**Power source circuit**

**● For [XL] area**




*** [XL] --- Australia**




**● For [XA], [PA], [PE] and [PC] areas**




***[XA] --- Asia, Latin America, Africa, Middle Near East and Oceania.**
***[PA] --- Far East PX.**
***[PE] --- European Military.**
***[PC] --- European Audio Club.**



# ■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

※ The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ✪ mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement part please use the part No. in the replacement part list.

**Note 1:**

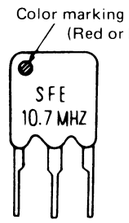
1. **S1 ~ S8** : Preset tuning switch. 1 ~ 16 CH
2. **S11** : Memory switch. (manual ◄►auto).
3. **S12** : Tuning (up) switch. [up : tuning to higher frequency]
4. **S13** : Tuning (down) switch. [down : tuning to lower frequency]
5. **S16** : FM selector switch. ( — frequency shift +25 kHz)
6. **S17** : AM selector switch. ( — allocation 9 kHz/10 kHz)
7. **S18** : FM mode switch. (auto ◄►mono).
8. **S20** : Scan level switch. ( — dB, — level)
9. **S21** : FM signal — strength indicator switch. (off ◄►on)
10. **S701** : Power source switch in "**on**" position.
11. **S702** : Voltage selector switch.
    [XA], [PA] [PE] and [PC] only (110V ◄►127V◄►220V◄►240V)
12. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
    * Voltage with numerical volume only is the voltage with FM mono signal received.
    * Figures in ▭ stand for DC voltage in muting mode.
    * Figures in ( ) stand for DC voltage in AM signal reception mode.
13. ⇨ FM signal ▬▬▶ AM OSC
    ➡ AM signal ┈┈ AF signal lines
    ▭▭▷ FM OSC ——— Positive voltage lines.
14. Important safety notice:
    Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

**Note 2:**

**● Use of ceramic filters in pairs**

The ceramic filters (CF101, CF102) for FM-IF circuit are available in two ranks. For this machine, be sure to use the ceramics of the same rank in a pair.

At repairing and replacement, pay close attention to the diode (D901, D902) for use as different diodes must be used depending on each rank of the ceremic filters.




| RANK (Color) | D901 | D902 | CENTER FREQUENCY |
|---|---|---|---|
| Black | O | X | 10.65 MHz |
| Red | X | X | 10.70 MHz |

**Note:** O Mark Diode is used.
X Mark Diode is not used.

# ■ RESISTORS, CAPACITORS & REPLACEMENT PARTS LIST

**Notes:**

1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice:
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. The "Ⓢ" mark is service standard parts and may differ from production parts.
4. The unit of resistance is OHM (Ω).
   K = 1000Ω, M = 1000kΩ
5. The unit of capacitance is MICROFARAD (μF)
   P = $10^{-6}$ μF
6. Ⓚ -marked, parts are used for black only, while ○-marked parts are for silver type only.
7. Part other than Ⓚ -and ○-marked are used for both black and silver type.
8. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
9. The parenthesized numbers in the column of description stand for the quantity per set.

## Numbering System of Capacitor

**Example**

| ECKD | 1H | 102 | Z | F |
|---|---|---|---|---|
| Type | Voltage | Value | Tolerance | Peculiarity |
| ECEA | 50 | M | R47 | R |
| Type | Voltage | Peculiarity use | Value | Special use |

| Capacitor Type | Voltage | | Tolerance |
|---|---|---|---|
| | ECEA Type | Other | |
| ECEA : Electrolytic | OJ : 6.3V | 1H : 50V DC | C : ±0.25pF |
| ECCD : Ceramic | 1A : 10V | 2R3 : 2.3V DC | K : ±10% |
| ECKD : Ceramic | 1C : 16V | 1 : 125V DC | Z : +80%, −20% |
| ECQM : Polyester | 1E : 25V | | J : ±5% |
| ECQP : Polypropylene | 25 : 25V | | G : ±2% |
| EECW : Liquid electrolyte double layer capacitor | 1H : 50V | | |
| | 1V : 35V | | |

## Numbering System of Resistor

**Example**

| ERD | 25 | F | J | 101 |
|---|---|---|---|---|
| Type | Wattage | Shape | Tolerance | Value |

| Resistor Type | Wattage | Tolerance |
|---|---|---|
| ERD : Carbon | 25 : 1/4W | J : ±5% |
| ERO : Metal film | S2 : 1/4W | F : ±1% |
| | S1 : 1/2W | |

| Area |
|---|
| [EX] ...Switzerland and Scandinavia. |
| [EH] ...Holland. |
| [XA] ...Asia, Latin America, Africa, Middle Near East and Oceania. |
| [XL] ...Australia. |
| [PA] ...Far East PX. |
| [PE] ...European Military. |
| [PC] ...European Audio Club. |

## ● RESISTORS

| Ref. No. | Part No. | Value |
|---|---|---|
| R1 | ERDS2TJ104 | 100K |
| R2 | ERDS2TJ273 | 27K |
| R3 | ERDS2TJ101 | 100 |
| R101 | ERDS2TJ122 | 1.2K |
| R102 | ERDS2TJ104 | 100K |
| R103 | ERDS2TJ822 | 8.2K |
| R104 | ERDS2TJ222 | 2.2K |
| R105 | ERDS2TJ684 | 680K |
| R108 | ERDS2TJ333 | 33K |
| R114 | ERDS2TJ101 | 100 |
| R117 | ERDS2TJ331 | 330 |
| R118 | ERDS2TJ221 | 220 |
| R119 | ERDS2TJ122 | 1.2K |
| R121 | ERDS2TJ392 | 3.9K |
| R122, 123 | ERDS2TJ331 | 330 |
| R201 | ERDS2TJ104 | 100K |
| R202 | ERDS2TJ222 | 2.2K |

| Ref. No. | Part No. | Value |
|---|---|---|
| R203 | ERDS2TJ124 | 120K |
| R204 | ERDS2TJ563 | 56K |
| R205 | ERDS2TJ104 | 100K |
| R206 | ERDS2TJ101 | 100 |
| R207 | ERDS2TJ104 | 100K |
| R208 | ERDS2TJ393 | 39K |
| R209 | ERDS2TJ102 | 1K |
| R210 | ERDS2TJ104 | 100K |
| R211 | ERDS2TJ222 | 2.2K |
| R212 | ERDS2TJ473 | 47K |
| R301 | ERDS2TJ471 | 470 |
| R302 | ERDS2TJ563 | 56K |
| R303 | ERDS2TJ393 | 39K |
| R304, 305 | ERDS2TJ684 | 680K |
| R306, 307 | ERDS2TJ104 | 100K |
| R308 | EROS2TKF1502 | 15K |

| Ref. No. | Part No. | Value |
|---|---|---|
| R309 | ERDS2TJ102 | 1K |
| R310, 311 | ERDS2TJ104 | 100K |
| R312 | ERDS2TJ104 | 100K |
| R313 | ERDS2TJ103 | 10K |
| R314 | ERDS2TJ100 | 10 |
| R315 | ERDS2TJ393 | 39K |
| R316 | ERDS2TJ183 | 18K |
| R321, 322 | ERDS2TJ224 | 220K |
| R324 | ERDS2TJ564 | 560K |
| R326 | ERDS2TJ684 | 680K |
| R501 | ERDS2TJ103 | 10K |
| R701 Ⓢ ⚠ | ERD25FJ6R8 | 6.8K |
| R702 Ⓢ ⚠ | ERD25FJ102 | 1K |
| R703 | ERDS2TJ101 | 100 |
| R704 Ⓢ ⚠ | ERD25FJ561 | 560 |
| R705 | ERDS2TJ101 | 100 |
| R707 | ERDS2TJ473 | 47K |

| Ref. No. | Part No. | Value |
|---|---|---|
| R710 ⚠ | ERDS1FJ102 | 1K |
| R904 | ERDS2TJ681 | 680 |
| R905 | ERDS2TJ472 | 4.7K |
| R906 | ERDS2TJ182 | 1.8K |
| R907 | ERDS2TJ102 | 1K |
| R908 | ERDS2TJ123 | 12K |
| R910 | ERDS2TJ561 | 560 |
| R911 | ERDS2TJ102 | 1K |
| R912 | ERDS2TJ822 | 8.2K |
| R913 | ERDS2TJ123 | 12K |
| R915 | ERDS2TJ103 | 10K |
| R916 | ERDS2TJ682 | 6.8K |
| R917 | ERDS2TJ103 | 10K |
| R918 | ERDS2TJ102 | 1K |
| R919 Ⓢ | ERD25FJ182 | 1.8K |

## ● CAPACITORS

| Ref. No. | Part No. | Value |
|---|---|---|
| C1 | ECEA1EU3R3 | 3.3 |
| C2 Ⓢ | ECKD1H103ZF | 0.01 |
| C3 Ⓢ | ECCD1H101K | 100P |
| C101 Ⓢ | ECQM1H223JZ | 0.022 |
| C102 | ECEA0JU101 | 100 |
| C103 Ⓢ | ECQM1H103JZ | 0.01 |
| C104, 105 Ⓢ | ECKD1H103ZF | 0.01 |
| C106 Ⓢ | ECCD1H040CC | 4P |
| C107 Ⓢ | ECCD1H101K | 100P |
| C108 | ECEA0JU101 | 100 |
| C109 | ECEA1HUR22 | 0.22 |
| C110 Ⓢ | ECQM1H104JZ | 0.1 |
| C114 Ⓢ | ECKD1H103ZF | 0.01 |
| C116 Ⓢ | ECKD1H103ZF | 0.01 |
| C118, 119 Ⓢ | ECKD1H103ZF | 0.01 |
| C120, 121 Ⓢ | ECKD1H103ZF | 0.01 |
| C122 Ⓢ | ECQM1H223JZ | 0.022 |
| C202 Ⓢ | ECQM1H473JZ | 0.047 |

| Ref. No. | Part No. | Value |
|---|---|---|
| C203 Ⓢ | ECCD1H180KC | 18P |
| C204 | ECQP1471JZ | 470P |
| C205 | ECEA0JU101 | 100 |
| C206 Ⓢ | ECKD1H103ZF | 0.01 |
| C207 Ⓢ | ECCD1H080CC | 8P |
| C208 Ⓢ | ECCD1H470K | 47P |
| C209 Ⓢ | ECKD1H223ZF | 0.022 |
| C210 | ECEA0JU330 | 33 |
| C211 Ⓢ | ECKD1H103ZF | 0.01 |
| C212 | ECEA1HU010 | 1 |
| C213 Ⓢ | ECKD1H223ZF | 0.022 |
| C214 Ⓢ | ECQM1H153JZ | 0.015 |
| C215 Ⓢ | ECKD1H103ZF | 0.01 |
| C301 Ⓢ | ECKD1H103ZF | 0.01 |
| C302 Ⓢ | ECKD1H102ZF | 0.001 |
| C303 | ECEA1AU471 | 470 |

| Ref. No. | Part No. | Value |
|---|---|---|
| C305, 306 Ⓢ [EX, EH, XA, XL] | ECQM1H153JZ | 0.015 |
| C305, 306 Ⓢ [PA, PE, PC] | ECQM1H273JZ | 0.027 |
| C307, 308 | ECEA1EU3R3 | 3.3 |
| C309, 310 | ECEA1CU100 | 10 |
| C311 | ECQP2A391GZ | 390P |
| C312 | ECEA1CU100 | 10 |
| C313 | ECEA1HUR47 | 0.47 |
| C314, 315 | ECEA1HUR22 | 0.22 |
| C316 | ECEA1CU100 | 10 |
| C319 Ⓢ | ECKD1H103ZF | 0.01 |
| C502 | ECEA1HUR22 | 0.22 |
| C701 | ECEA1CU102 | 1000 |
| C702 | ECEA1CU222 | 2200 |
| C703 | ECEA1VU471 | 470 |

| Ref. No. | Part No. | Value |
|---|---|---|
| C704 | ECEA1CU471 | 470 |
| C705, 706 Ⓢ | ECKD1H103ZF | 0.01 |
| C707 | ECEA1AU471 | 470 |
| C708 Ⓢ | ECKD1H102ZF | 0.001 |
| C901 Ⓢ | ECKD1H103ZF | 0.01 |
| C902, 903 | EECW2R3A3R3E | 3.3F |
| C904 | ECEA0JU102 | 1000 |
| C905 Ⓢ | ECCD1H070CC | 7P |
| C906 Ⓢ | ECCD1H180KC | 18P |
| C907, 908 Ⓢ | ECKD1H103ZF | 0.01 |
| C909 Ⓢ | ECKD1H103ZF | 0.01 |
| C910 | ECEA25M4R7R | 4.7 |
| C911 Ⓢ | ECKD1H103ZF | 0.01 |
| C912 Ⓢ | ECCD1H680K | 68P |
| C914 | ECEA1CU100 | 10 |
| C921 Ⓢ | ECCD1H390K | 39P |



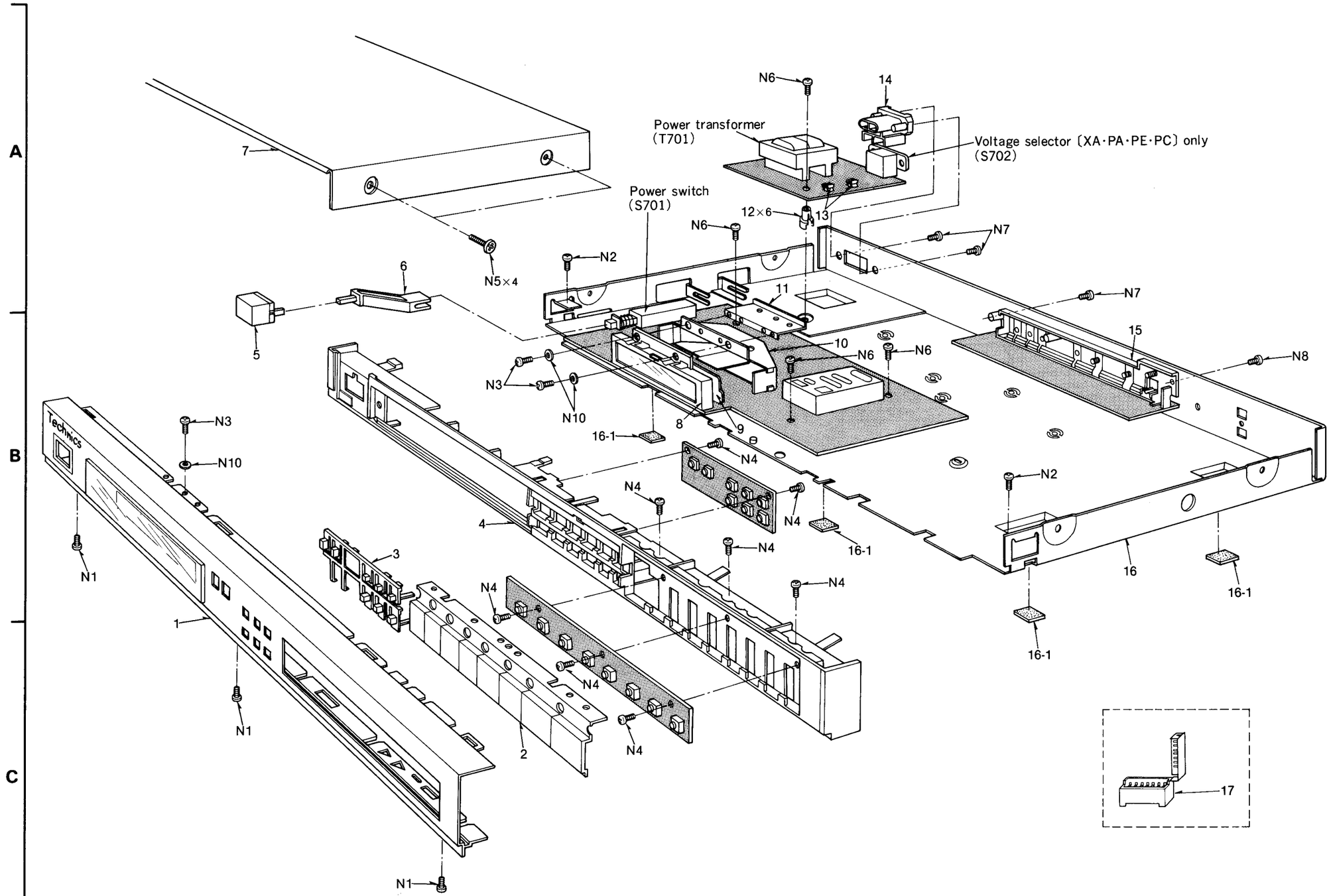
| Ref. No. | Part No. | Description |
|---|---|---|
| **INTEGRATED CIRCUITS** | | |
| IC101 | AN7274NS | FM IF Amp./AM IF Amp. |
| IC102 | AN278 | FM IF Amp. |
| IC301 | AN7472S−A | MPX |
| IC901 | UPD1714G511A | PLL Controller |
| **TRANSISTORS** | | |
| Q201, 705, 706, 902, 903 | 2SC1815Y | AM Stop Level Switching, FM/AM Selector, FM/AM Loop Filter |
| Q701, 702 | 2SC1815Y | Regulator |
| Q904, 905 Ⓢ | 2SA722−S | FM/AM Loop Filter, Switching |
| **DIODES** | | |
| D101, 102, 202, 203, 301, 302, 304, 906∼909, 911∼917, 919, 920, 922, 926, 927 | MA165 | Switching |
| D201 | SVDKV1236Z | AFC |
| D305 | MA4082M | Zener, 8.2V |
| D701, 702 Ⓢ ⚠ | SVDSR1K2 | Rectifier |
| D703 | MA4150M | Zener, 15V |
| D704 | MA4062−M | Zener, 6.2V |
| D901, 902 Ⓢ | MA162A | Switching |
| D905 [XA] only | MA165 | Switching |
| **COILS** | | |
| L10, 901 | RLQY25S5−0 | Choke |
| L202 | SLA2B1−M | AM Antenna |
| L203 | SLO2B7−M | AM OSC |
| **TRANSFORMERS** | | |
| T101 | SLI4B520−Z | FM IFT |
| T102 | SLI4B521−Z | FM IFT |
| T201 | SLI2B104−M | AM IFT |
| **T701** [EX, EH] ⚠ | SLT5K171 | Power Source |
| **T701** [XL] ⚠ | SLT5J227 | Power Source |
| **T701** [XA] ⚠ | SLT5K173 | Power Source |
| **CERAMIC FILTERS** | | |
| CF101 | SVFE107MZ2−A | FM, 10.7MHz (Red) |
| CF101 | SVFE107MZ2−D | FM, 10.65MHz (Black) |
| CF102 | SVFE107MM−A | FM, 10.7MHz (Red) |
| CF102 | SVFE107MM−D | FM, 10.65MHz (Black) |
| (Use pair ranks as same as CF101 and CF102) | | |
| CF201 | SVFSFZ450F7L | AM, 450kHz |
| **CRYSTAL** | | |
| X901 | SVQ49U452−T | 4.5MHz |
| **VARIABLE RESISTORS** | | |
| VR101, 301 | EVN58AA00B15 | Signal Strength Level Adj., Separation Adj., 100kΩ (B) |
| **VARIABLE CAPACITOR** | | |
| CT201 | SVCTZ03T110F | AM Antenna |
| **FRONT END** | | |
| RF | SNVFE306E15 | FM Tuner Pack |
| **THERMISTER** | | |
| TH101 | ERTD2ZHL332S | 3.3kΩ |

| Ref. No. | Part No. | Description |
|---|---|---|
| **COMPONENT COMBINATION** | | |
| Z301 | EXRP203Z104T | 0.02μF, 100kΩ |
| **LAMP** | | |
| PL1 ⚠ | XAMS15S150 | AC 9.6V, 0.27A |
| **FUSE** | | |
| F1 ⚠ | XBA2C05TR0 | Power Source, 250V, T500mA |
| **LIQUID CRYSTAL PANEL** | | |
| LCD | SALHLC9151 | |
| **SWITCHES** | | |
| S1∼8, 11∼13, 16∼18, 20, 21 | SSG13 | Preset Tuning, Tuning, Band Selector, FM Mode |
| S701 ⚠ | SSH1069 | Power Source |
| S702 [XA, PA, ⚠ PE, PC] only | SSR187−1 | Voltage Selector |

| Ref. No. | Part No. | Description |
|---|---|---|
| **CABINET and CHASSIS PARTS** | | |
| 1 ○ [PA, PE] only | SGWTG3−SP | Front Panel Ass'y (1) (Silver Type) |
| 1 other ○ | SGWTG3−SE | Front Panel Ass'y (1) (Silver Type) |
| 1 Ⓚ | SGWTG3−KE | Front Panel Ass'y (1) (Black Type) |
| 2 ○ | SBC631−1 | Button, Preset (1) Tuning (Silver Type) |
| 2 Ⓚ | SBC631−3 | Button, Preset (1) Tuning (Black Type) |
| 3 | SBC561−12 | Button, Band (1) Selector/Tuning/ Memory |
| 4 ○ | SGX7613−6 | Front Sub Panel (1) (Silver Type) |
| 4 Ⓚ | SGX7613−7 | Front Sub Panel (1) (Black Type) |
| 5 | SBC666 | Button, Power (1) Switch |
| 6 | SUB201 | Connection Rod, (1) Power Switch |
| 7 ○ | SKCTG3−SE | Cabinet (Silver Type) (1) |
| 7 Ⓚ | SKCTG3−KE | Cabinet (Black Type) (1) |
| 8 | SHR9736 | Case, LCD (1) |
| 9 | SDU267 | Filter, LCD (1) |
| 10 | SMPTG6T−KN | Case, Lamp (1) |
| 11 | SUW2853 | Bracket, Lamp Case (1) |
| 12 | SHE170 | Cpacer, P.C.B (6) |
| 13 | SJT347 | Fuse Holder (2) |
| 14 ⚠ | SJS9230 | Socket, AC Inlet (1) |
| 15 | SJF8709−1N | Terminal Board (1) |
| 16 [EX] | SGPTG3−SE | Rear Panel Ass'y (1) |
| 16 [EH] | SGPTG3−SH | Rear Panel Ass'y (1) |
| 16 [XA, PC] | SGPTG3−SX | Rear Panel Ass'y (1) |
| 16 [XL] | SGPTG3−SL | Rear Panel Ass'y (1) |
| 16 [PA, PE] | SGPTG3−SP | Rear Panel Ass'y (1) |
| [16-1 | [ SKL293 | Foot (4) |
| 17 | SJS5327 | Connector (3 pin) (1) |
| 17 | SJS5421 | Connector (4 pin) (1) |
| 17 | SJS5519 | Connector (5 pin) (1) |

| Ref. No. | Part No. | Description |
|---|---|---|
| **CABINET and CHASSIS PARTS** | | |
| 17 | SJS5627 | Connector (6 pin) (1) |
| 17 | SJS5707 | Connector (7 pin) (1) |
| **SCREWS** | | |
| N1 | XTB3+6JFZ | Tapping, ⊕3×6 (3) |
| N2 | XTN3+8TFR | Tapping, ⊕3×8 (2) |
| N3 Ⓢ | XSN3+6BNS | ⊕3×6 (3) |
| N4 | XTB3+8G | Tapping, ⊕3×8 (8) |
| N5 ○ | SNE2095−4 | Cabinet (4) |
| N5 Ⓚ | SNE2095−5 | Cabinet (4) |
| N6 | XTBS3+12F1 | Tapping, ⊕3×12 (4) |
| N7 | XTB3+8GFZ | Tapping, ⊕3×8 (3) |
| N8 | XTBS3+8BFZ1 | Tapping with (1) Detent, ⊕3×8 |
| **WASHER** | | |
| N10 Ⓢ | XWA3BFN | Spring, ϕ3 (3) |
| **ACCESSORIES** | | |
| A1 | SJP2129−5 | Connection Cord (1) |
| A2 | SSA611−1 | Loop Antenna (1) |
| A3 | XTN3+10AFZ | Screw (2) |
| A4 | SMA231 | Holder, Loop Antenna (1) |
| A5 | SMA233−1 | Holder, Loop Antenna (1) |
| A6 | SSA269 | Cord, FM Antenna (1) |
| A7 [XL] ⚠ | SJA163 | AC Cord (1) |
| A7 ⚠ [PA, PE] | SJA168 | AC Cord (1) |
| A7 ⚠ [EX, EH, XA, PC] | SFDAC05E02 | AC Cord (1) |
| A8 ⚠ [XA, PC] only | SJP5213−1 | Plug Adaptor (1) |
| A8 ⚠ [PA, PE] only | SJP9215 | Plug Adaptor (1) |
| A9 [PA, PE] | SQF12275 | Instruction Book (1) |
| A9 other | SQF12274 | Instruction Book (1) |
| **PACKING PARTS** | | |
| P1 | XZB24X40C05 | Polyethylene Bag (1) (Accessories) |
| P2 ○ | SPP697 | Polyethylene Bag (1) (Silver Type) |
| P2 Ⓚ | SPP734 | Polyethylene Bag (1) (Black Type) |
| P3 [XL] only | SPS4584−1 | Pad, Front Side (1) |
| P3 other | SPS4584 | Pad, Front Side (1) |
| P4 [XL] only | SPS4585−1 | Pad, Rear Side (1) |
| P4 other | SPS4585 | Pad, Rear Side (1) |
| P5 | SPS4552 | Pad, Accessories (1) |
| P6 [XL] only | SPG5164 | Carton Box (1) (Silver Type) |
| P6 ○ other | SPG5157 | Carton Box (1) (Silver Type) |
| P6 Ⓚ other | SPG5158 | Carton Box (1) (Black Type) |
| P7 Ⓚ [XL] only | SGK1413 | Label (2) (Black Type Only) |

## ■ EXPLODED VIEW




| | | |

ORDER NO. HAD8503245IS6

# Service Manual

Supplement

QUARTZ Synthesizer
FM/AM Stereo Tuner

Tuner
**ST-G3**

QUARTZ Synthesizer
FM/MW/LW Stereo Tuner

Tuner
**ST-G3L**

**Color**

(S)...Silver Type
(K)...Black Type

Please use this manual together with the service manual for Model No. ST-G3, Order No. HAD84122364C9 and Order No. HAD85012385C2 or Model No. ST-G3L Order No. HAD84122365C2.

| Color | Areas |
|---|---|
| (S) (K) | [EX]..... Switzerland and Scandinavia. |
| (S) (K) | [EGB].... F.R. Germany. |
| (S) (K) | [EH] ..... Holland. |
| (S) (K) | [XA]..... Asia, Latin America, Afirca, Middle Near East, and Oceania. |
| (S) (K) | [XL]..... Australia. |
| (S) (K) | [PA]..... Far East PX. |
| (S) (K) | [PE]..... European Military. |
| (S) (K) | [PC] ..... European Audio Club. |
| (S) (K) | [EK]..... United Kingdom. |
| (S) (K) | [EF]..... France. |
| (S) (K) | [EB]..... Belgium. |

The adjusting procedure and illustration for "FM MONO DISTORTION ADJUSTMENT" of Model No. ST-G3 or ST-G3L were wrong.
The correct adjusting procedure and illustration are shown below. So please correct the Service Manual.

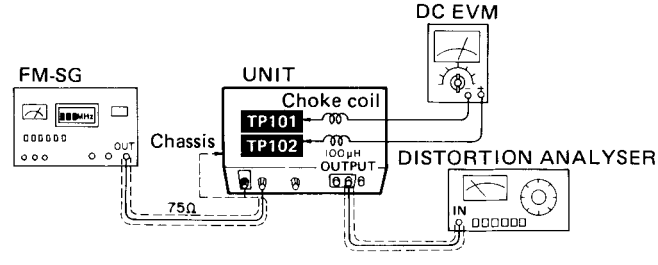
## ■ MEASUREMENTS AND ADJUSTMENTS

### FM MONO DISTORTION ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "**FM**" position.
3. Place the radio frequency display and signal generator setting to **100.10 MHz**.
4. Adjust **T101** core so that voltage measured in signal mode is **0 mV (0 ± 50 mV)** in 300mV range.
5. Adjust **T102** so that the distortion factor of L ch is minimized.
6. Repeat steps 4 and 5 a few times.
7. Make sure that the distortion factors of L ch and R ch are nearly the same with each other and are less than **0.4%**.

**Note:** The adjusting screwdriver used should be made of resin.

FM SIGNAL GENERATOR CONDITION
Modulation..... 100%
Modulation frequency..... 400 Hz
Output level..... 66 dB




Technics

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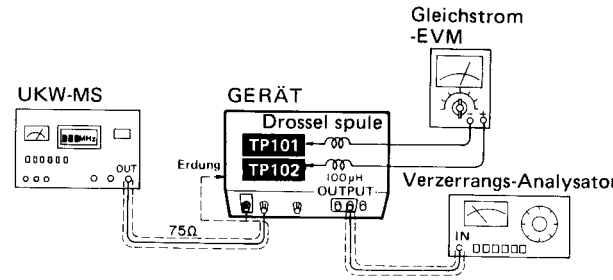
# ■ MESSUNGEN UND JUSTIERUNGEN

## UKW-MONO-VERZERRUNGS-JUSTIERUNG

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Das Gerät auf "**FM**" einstellen.
3. Die Radiofrequenzanzeige und den Meßsender auf **100.10 MHz** einstellen.
4. Den Kern von **T101** so justieren, daß die im Signalzustand gemessene Spannung **0 mV (0 ± 50 mV)** im 300 mV-Bereich beträgt.
5. **T102** so justieren, daß der Verzerrungsfaktor des linken Kanals minimal wird.
6. Schritte 4 und 5 einige Male wiederholen.
7. Überprüfen, daß die Verzerrungsfaktoren des linken und rechten Kanals fast gleich sind und weniger als **0,4%** betragen.

**Anmerkung:** Für die Justierung ist ein Schraubendreher aus Kunststoff zu verwenden.

ZUSTAND DES UKW-MESSENDERS
Modulation . . . . . 100%
Modulationsfrequenz. . . 400 Hz
Ausgangspegel. . . . . 66 dB



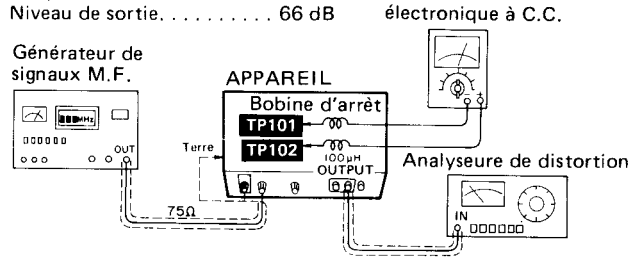

# ■ MESURAGES ET REGLAGES

## REGLAGE DE DISTORSION MONOPHONIQUE M.F.

1. Le raccordement de l'équipement d'essai est montré sur l'illustration.
2. Régler l'appareil sur la position "**FM**" (M.F.).
3. Ajuster le réglage de l'affichage de radiofréquence et du générateur de signaux sur **100,10 MHz**.
4. Régler le noyau de **T101** de telle sorte que la tension mesurée sur le mode de signaux soit de **0 mV (0 ± 50mV)** dans une plage de 300 mV.
5. Ajuster **T102** de telle que le facteur de distorsion du canal de gauche soit minimisé.
6. Répéter les étapes 4 et 5 quelques fois.
7. S'assurer que les facteurs de distorsion du canal de gauche et du canal de droite soient sensiblement les mêmes l'un par rapport à l'autre et soient inférieurs à **0,4%**.

**Nota:** Le tournevis de réglage utilisé devra être fait en résines.

CONDITION DU GENERATEUR
DE SIGNAUX M.F.
Modulation . . . . . 100%
Fréquence de modulation. . .400 Hz
Niveau de sortie. . . . . 66 dB



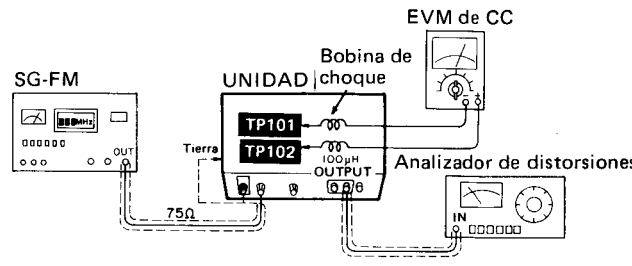

# ■ MEDICIONES Y AJUSTES

## AJUSTE DE DISTORSION MONO FM

1. La conexión del equipo de prueba se muestra en la figura.
2. Ajustar la unidad a la posición "**FM**".
3. Colocar la puesta del indicador de radiofrecuencia y generador de señales a **100,10 MHz**.
4. Ajustar el núcleo de **T101** de manera que el voltaje medido en modalidad de señal sea **0 mV (0 ± 50 mV)** en gama de 300 mV.
5. Ajustar **T102** de manera que el factor de distorsión de CH I se minimice.
6. Repetir los pasos 4 y 5 algunas veces.
7. Asegurarse de que los factores de distorsión de CH I y CH D sean casi los mismos uno con el otro y sean menos de **0,4%**.

**Nota:** El destornillador de ajuste usado debe estar hecho de resina.

CONDICION DE GENERADOR
DE SEÑALES DE FM
Modulación . . . . . 100%
Frecuencia de modulación . . . 400 Hz
66 dB




Printed in Japan
850305600 Ⓗ KK

ORDER NO. HAD84122364C9-A

# QUARTZ Synthesizer FM/AM Stereo Tuner

# ST-G3

DEUTSCH

- This booklet contains the specifications and adjusting procedures for ST–G3, written in German, French and Spanish.
- File this manual together with the ST-G3 service manual (Order No. HAD84122364C9).

- Das vorliegende Büchlein enthält die technische Daten und Justierverfahren für den ST–G3 in deutscher, französischer und spanischer Sprache.
- Bewahren Sie das Büchlein zusammen mit der Bedienungsanleitung für den ST–G3 auf (Bestell-Nr, HAD84122364C9).

- Cette brochure contient les spécifications et les procédures de mises au point pour le ST–G3, écrites en allemand, en français et en espagnol.
- Classer ce manuel en même temps qu'avec le manuel de service du ST–G3 (N° d'order : HAD84122364C9).

- Este librito contiene la especificaciones y procedimientos de ajuste para ST–G3, escritos en alemán, francés y español.
- Guardar este manual juntamente con el manual de servico de ST–G3 (Pedido N°. HAD84122364C9).

## DEUTSCH

## ■ TECHNISCHE DATEN

(Die technischen Daten können infolge von Verbesserungen ohne Ankündigung geändert werden.)

### (DIN 45 500)

#### ■ UKW-TUNERTEIL

| | |
|---|---|
| **Wellenbereich** | 87,50 ~ 108,00 MHz<br>87,525~108,00 MHz (+25 kHz Umschaltung) |
| **Eingangsempfindlichkeit** | 0,95μV (nutzbar nach IHF) |
| **S/R 30 dB** | 1,0 μV (75Ω) |
| **S/R 26 dB** | 0,9 μV (75Ω) |
| **S/R 20 dB** | 0,8 μV (75Ω) |
| **Stereoumschaltschwelle bei 46 dB nach IHF** | 22 μV/75 Ω |
| **Gesamtklirrfaktor** | |
| **Mono** | 0,09% |
| **Stereo** | 0,2% |
| **Geräuschspannungsabstand** | |
| **Mono** | 70 dB (76 dB nach IHF) |
| **Stereo** | 65 dB (71 dB nach IHF) |
| **Frequenzgang** | 4 Hz~18 kHz, (+0,5 dB~ −1,5 dB) |
| **Trennschärfe bei Störsender** | |
| **normal ±400 kHz** | 65 dB |
| **Einfangverhältnis** | 1,0 dB |
| **Spiegelfrequenz-Dämpfung bei 98 MHz** | 55 dB |
| **ZF-Dämpfung bei 98 MHz** | 90 dB |
| **Ansprechdämpfung auf Nebenfrequenzen bei 98 MHz** | 80 dB |
| **MW-Unterdrückung** | 55 dB |
| **Übersprechdämpfung** | |
| **1 kHz** | 50 dB |
| **10 kHz** | 40 dB |
| **Trägerrest** | |
| **19 kHz** | −65 dB (−70 dB nach IHF) |
| **38 kHz** | −45 dB (−50 dB nach IHF) |
| **Kanalabweichung (250 Hz ~ 6300 Hz)** | ±1,0 dB |
| **Begrenzereinsatz** | 0,75 μV |
| **Bandbreite** | |
| **ZF-Verstärker** | 180 kHz |
| **UKW-Demodulator** | 1000 kHz |
| **Antennenanschluß** | 75 Ω (unsymmetrisch) |

#### ■ MW-TUNERTEIL

| | |
|---|---|
| **Wellenbereiche** | |
| **(für Europa, Südafrika und Australien)** | |
| | 522~1611 kHz (9-kHz-Schritte) |
| | 530~1610 kHz (10-kHz-Schritte) |
| **(für Saudi-Arabien und die übrigen Länder)** | |
| | 531~1610 kHz (9-kHz-Schritte) |
| | 530~1610 kHz (10-kHz-Schritte) |
| **Eingangsempfindlichkeit (S/R 20 dB)** | 20 μV, 290 μV/m |
| **Trennschärfe (±9 kHz)** | 55 dB |
| **Spiegelfrequenz-Dämpfung bei 999 kHz** | 40 dB |
| **ZF-Dämpfung bei 999 kHz** | 60 dB |

#### ■ ALLGEMEINE DATEN

| | |
|---|---|
| **Ausgangsspannung** | 0,3 V (0,6 V IHF) |
| **Leistungsaufnahme** | 9W |
| **Netzspannung** | |
| **Für Kontinentaleuropa** | Wechselstrom 50 Hz/60 Hz, 220V |
| **Für andere Länder** | Wechselstrom 50 Hz/60 Hz, 110V/127V/220V/240V |
| **Abmessungen (B×H×T)** | 430 × 53 × 245 mm |
| **Gewicht** | 2,2 kg |

**Bemerkung:**
Der Gesamtklirrfaktor wurde mit einem digitalen Rauschspektrometer (Anlage H.P. 3045) gemessen.

# ■ MESSUNGEN UND JUSTIERUNGEN

## MW/UKW

**Einstellungen der Bedienelemente und zu verwendende Geräte.**

- MW/UKW-Meßsender (MW/UKW-MS)
- Stereo-Modulator
- Oszilloskop
- Elektronische Wechselstrom- und Gleichstrom-Voltmeter (EVM).
- Frequenzzähler
- Drosselspule (100μH)
- Widerstand (100kΩ)
- Keramischer Kondensator (200pF)

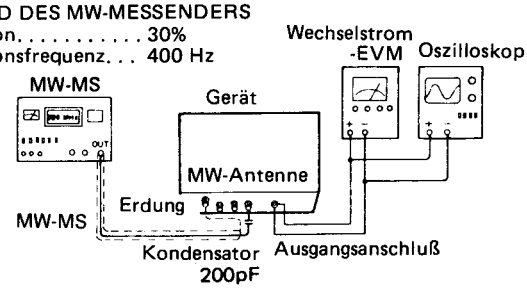
**Anmerkung:** Für **T201** (MW-ZFT) und **L203** (MW-OSZ-Spule) werden bereits justierte Ersatzteile geliefert. Die Kerne dieser Teile daher nicht drehen.

### MW-HF-JUSTIERUNG

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Das Gerät auf "AM" einstellen.
3. Die Radiofrequenzanzeige und den Meßsender auf 612 kHz einstellen.
4. **L202** auf maximale Ausgangsleistung abgleichen.
5. Die Radiofrequenzanzeige und den Meßsender auf 1503 kHz einstellen.
6. **CT201** auf maximale Ausgangsleistung abgleichen.
7. Die Schritte 3—6. wiederholen.

**Anmerkung:** Der Antenneneingang-Signalpegel muß so niedrig wie möglich und frei von automatischer Verstärkungsregelung (AGC) sein.

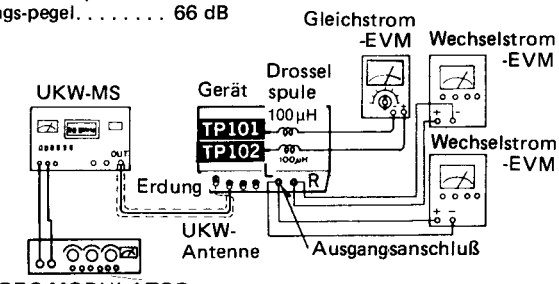
ZUSTAND DES MW-MESSENDERS
Modulation. . . . . 30%
Modulationsfrequenz. . . 400 Hz




### UKW-MONO-VERZERRUNGS-JUSTIERUNG

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Das Gerät auf "FM" einstellen.
3. Die Radiofrequenzanzeige und den Meßsender auf 100,10 MHz einstellen.
4. Den Kern von **T101** so justieren, daß die im Signalzustand gemessene Spannung **0 mV** (0 ± 50 mV) im 300 mV-Bereich beträgt.
5. Die Ausgangsbetriebsart der Stereomodulation auf "L" oder "R" einstellen.
6. **T102** so justieren, daß der "L"-Kanal ("R"-Kanal) minimal ist.
7. Die Schritte 4 — 6 wiederholen und sicherstellen, daß die Verzerrung zwischen "L"-Kanal und "R"-Kanal fast gleich ist und nicht mehr als **4%** beträgt.

ZUSTAND DES UKW-MESSENDERS
Modulation . . . . . 100%
Modulationsfrequenz. . . 400 Hz
Ausgangs-pegel. . . . . 66 dB

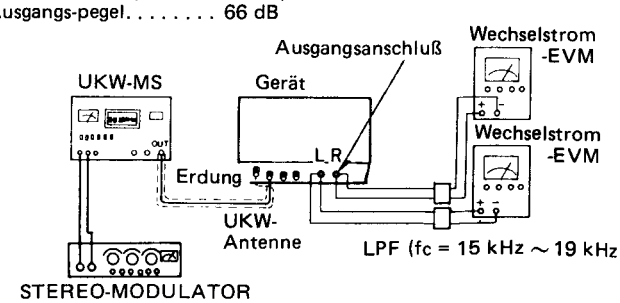



STEREO-MODULATOR
Ausgangs-Betriebsart. . . . L oder R

### TRENNUNGS-JUSTIERUNG

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Das Gerät auf "FM" einstellen.
3. Die Radiofrequenzanzeige und den Meßsender auf 100,10 MHz einstellen.
4. **VR301** so justieren, daß der R-Ausgang minimal ist, wenn der Stereomodulator im L-Betriebszustand (Linker Kanal moduliert) ist.
5. Für den "R"-Kanal muß die "R"-Betriebsart gewählt werden; und L ⟶ R und R ⟶ L-Trennung muß mindestens **40 dB** betragen.

ZUSTAND DES UKW-MESSENDERS
Modulation. . . . . "L" order "R" Betriebsart
90%, Pilotsignal 10%
Modulationsfrequenz. . . 1 kHz, Pilot (19 kHz)
Ausgangs-pegel. . . . . 66 dB

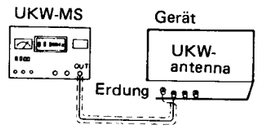


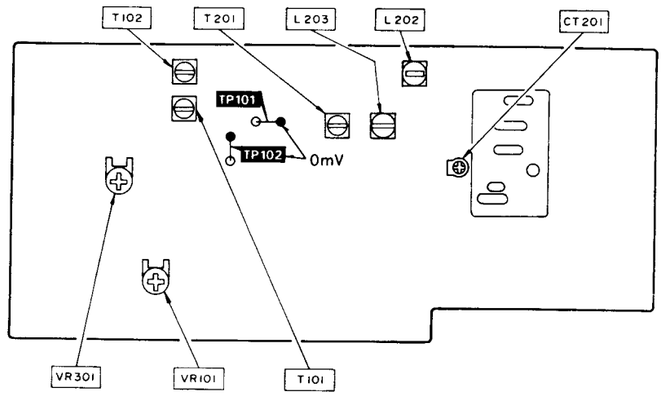

STEREO-MODULATOR

## SIGNALSTÄRKEPEGEL-JUSTIERUNG

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Das Gerät auf "FM" einstellen.
3. Die Radiofrequenzanzeige und den Meßsender auf 100,10 MHz einstellen.
4. Die Flüssigkristallanzeige-Betriebsart von "**Frequenz**" auf "**dB**" umschalten, durch Drücken der UKW-Signaltaste.
5. **VR101** so justieren, daß 54 dB angezeigt wird.
6. Überprüfen, daß der Signalstärkepegel **22 ~ 38 dB** beträgt, wenn die Eingangsleistung **30 dB** ist.

ZUSTAND DES UKW-MESSENDERS
Modulation. . . . . 30%
Modulationsfrequenz. . . 400 Hz
Ausgangs-pegel. . . . . 66 dB






# FRANÇAIS

## ■ CARACTERISTIQUES

(Sujet à changement sans préaris)

### (DIN 45 500)

#### ■ SECTION SYNTONISATEUR FM

| | |
|---|---|
| **Gamme de fréquence** | 87,50~108,00 MHz<br>87,525~108,00 MHz (déviation +25 kHz) |
| **Sensibilité** | 0,95 $\mu$V (IHF utilisable) |
| **S/B 30 dB** | 1,0 $\mu$V (75Ω) |
| **S/B 26 dB** | 0,9 $\mu$V (75Ω) |
| **S/B 20 dB** | 0,8 $\mu$V (75Ω) |
| **Sensibilité stéréo au seuil de 46 dB, IHF** | 22 $\mu$V/75Ω |
| **Distorsion harmonique totale** | |
| **MONO** | 0,09% |
| **STEREO** | 0,2% |
| **Signal/Bruit** | |
| **MONO** | 70 dB (76 dB, IHF) |
| **STEREO** | 65 dB (71 dB, IHF) |
| **Réponse de fréquence** | 4 Hz~18 kHz, +0,5 dB~ −1,5 dB |
| **Sélectivité alternée par canal** | |
| **normal ±400 kHz** | 65 dB |
| **Taux de capture** | 1,0 dB |
| **Rejection d'image à 98 MHz** | 55 dB |
| **Rejection FI à 98 MHz** | 90 dB |
| **Rejection de réponse parasite à 98 MHz** | 80 dB |
| **Suppression AM** | 55 dB |
| **Séparation stéréophonique** | |
| **1 kHz** | 50 dB |
| **10 kHz** | 40 dB |
| **Fuite de porteuse** | |
| **19 kHz** | −65 dB (−70 dB, IHF) |
| **38 kHz** | −45 dB (−50 dB, IHF) |
| **Equilibrage de canaux (250 Hz~6,300 Hz)** | ±1,0 dB |
| **Point de limite** | 0,75 $\mu$V |
| **Largeur de bande** | |
| **Amplificateur FI** | 180 kHz |
| **Démodulateur FM** | 1000 kHz |
| **Bornes d'antenne** | 75Ω (asymétrique) |

#### ■ SECTION SYNTONISATEUR AM

| | |
|---|---|
| **Gamme de fréquence** | |
| **(Pour l'Europe, l'Afrique du Sud et l'Australie)** | |
| | 522~1611 kHz (9 kHz par palier) |
| | 530~1610 kHz (10 kHz par palier) |
| **(Pour l'Arabie Saoudite et les autres pays)** | |
| | 531~1610 kHz (9 kHz par palier) |
| | 530~1610 kHz (10 kHz par palier) |
| **Sensibilité (S/B 20 dB)** | 20 $\mu$V, 290 $\mu$V/m |
| **Sélectivité** (±9 kHz) | 55 dB |
| **Réjection d'image à 999 kHz** | 40 dB |
| **Réjection FI à 999 kHz** | 60 dB |

#### ■ DIVERS

| | |
|---|---|
| **Tension de sortie** | 0,3 V (0,6 V IHF) |
| **Consommation** | 9W |
| **Alimentation** | |
| **Pour l'Europe** | CA 50 Hz/60 Hz, 220V |
| **Autres** | CA 50 Hz/60 Hz, 110V/127V/220V/240V |
| **Dimensions (L×H×Pr)** | 430 × 53 × 245 mm |
| **Poids** | 2,2 kg |

**Remarque:**
On mesure la distorsion harmonique totale au moyen d'un analyseur de spectre digital (Système H.P. 3045).

## ■ MESURAGES ET REGLAGES

### A.M./F.M.

**Positionnements des commandes et équipement utilisé**

- Générateur de signaux M.F. et A.M. (AM et FM-SG).
- Modulateur stéréophonique
- Analyseur de distorsion
- Oscilloscope
- Voltmètre électronique à C.A. et C.C. (EVM).
- Compteur de fréquence
- Bobine d'amortissement d'arrêt (100$\mu$H)
- Résistance (100kΩ)
- Condensateur céramique (200pF)

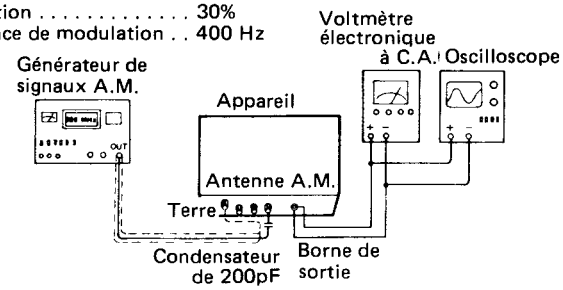
**Nota:** Pour **T201** (A.M.-Transf. de fréq. interm.) et **L203** (bobine oscil. de A.M.), ajuster les éléments qui sont fournis. Aussi, ne pas tourner les noyaux de ces éléments.

## REGLAGE DE A.M.-H.F.

1. Le raccordement de l'équipement d'essai est montré sur l'illustration.
2. Régler l'appareil sur la position "AM".
3. Ajuster le réglage de l'affichage de radiofréquence et du générateur de signaux sur 612 kHz.
4. Régler **L202** pour une sortie maximale.
5. Ajuster le réglage de l'affichage de radiofréquence et du générateur de signalx sur 1503 kHz.
6. Régler **CT201** pour une sortie maximale.
7. Répéter les étapes 3 ~ 6.

**Nota:** Le niveau d'entrée d'antenne doit être aussi bas que possible étant libéré de la commande automatique de gain.

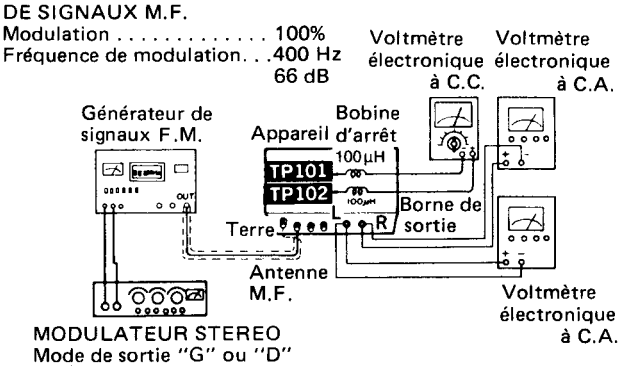
CONDITION DU GENERATEUR DE SIGNAUX A.M.
Modulation . . . . . 30%
Fréquence de modulation . . 400 Hz




## REGLAGE DE DISTORSION MONOPHONIQUE M.F.

1. Le raccordement de l'équipement d'essai est montré sur l'illustration.
2. Régler l'appareil sur la position "FM" (M.F.).
3. Ajuster le réglage de l'affichage de radiofréquence et du générateur de signaux sur 100,10 MHz.
4. Régler le noyau de **T101** de telle sorte que la tension mesurée sur le mode de signaux soit de **0 mV** (0 ± 50mV) dans une plage de 300 mV.
5. Régler le mode de sortie de la modulation stéréo sur "G" (gauche) ou "D" (droite).
6. Ajuster **T102**, de telle sorte que le canal "G" (canal "D") soit minimisé.
7. Répéter les étapes 4 ~ 6 et s'assurer que la distorsion soit presque la même entre les canaux "G" et "D" (gauche et droite) et inférieure à **4%**.

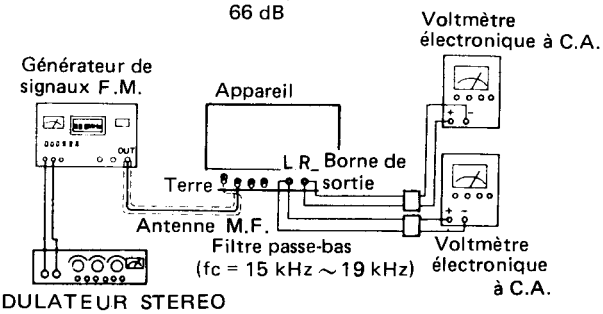
CONDITION DU GENERATEUR DE SIGNAUX M.F.
Modulation . . . . . 100%
Fréquence de modulation. . .400 Hz
66 dB




## REGLAGE DE SEPARATION

1. La raccordement de l'équipement d'essai est montré sur l'illustration.
2. Régler l'appareil sur la position "FM" (M.F.).
3. Ajuster le réglage de l'affichage de radiofréquence et du générateur de signaux sur 100,10 MHz.
4. Ajuster **VR301** de telle sorte que la sortie de droite soit minimisée lorsque le modulateur stéréo est sur le mode "G" (modulation du canal de gauche).
5. Le mode devra être de "D" (droite) pour le canal "D"; et la séparation "G" ⟶ "D", "D" ⟶ "G" devra être d'au moins **40 dB**.

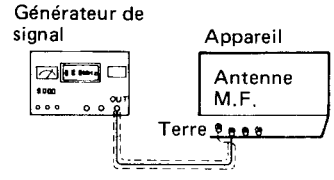
CONDITION DU GENERATEUR DE SIGNAUX M.F.
Modulation. . . . . Mode "G" ou mode "D" à 90%, Signal de commande à 10%.
Fréquence de modulation. . .1 kHz, Pilot (19 kHz)
66 dB

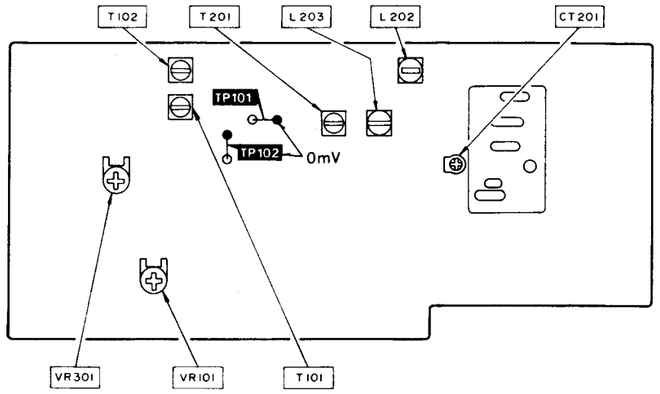



## REGLAGE DU NIVEAU D'INTENSITE DE RECEPTION

1. Le raccordement de l'équipement d'essai est montré sur l'illustration.
2. Régler l'appareil sur la position "FM".
3. Ajuster le réglage de l'affichage de radiofréquence et du générateur de signaux sur 100,10 MHz.
4. Changer l'affichage à cristaux liquides de "**fréquence**" sur "**dB**" en appuyant sur la touche de signaux FM (M.F.)
5. Ajuster **VR101** de telle sorte que 54 dB soit indiqué.
6. S'assurer que le niveau d'intensité de réception soit de **22 ~ 38 dB** lorsque l'entrée est de **30 dB**.

CONDITION DU GENERATEUR DE SIGNAUX M.F.
Modulation . . . . . 30%
Fréquence de modulation. . .400 Hz
66 dB






# ESPAÑOL

## ■ ESPECIFICACIONES

(Estas especificationes están sujetas a cualquier cambio sin previo eviso.)

**(DIN 45 500)**

### ■ SECCION PARA SINTONIZADOR FM

| | |
|---|---|
| **Gama de frecuencias** | 87,50~108,00 MHz |
| | 87,525~108,00 MHz (desviación +25 kHz) |
| **Sensibilidad** | 0,95 $\mu$V (IHF, utilizable) |
| **Señal a ruido 30 dB** | 1,0 $\mu$V (75Ω) |
| **Señal a ruido 26 dB** | 0,9 $\mu$V (75Ω) |
| **Señal a ruido 20 dB** | 0,8 $\mu$V (75Ω) |
| **Sensibilidad de acallamiento estéreo de 46 dB IHF** | 22 $\mu$V/75Ω |
| **Distorsión armónica total** | |
| **MONO. (MONO)** | 0,09% |
| **ESTEREO (STEREO)** | 0,2% |
| **Relación de señal a ruido** | |
| **MONO. (MONO)** | 70 dB (76 dB, IHF) |
| **ESTEREO (STEREO)** | 65 dB (71 dB, IHF) |
| **Respuesta de frecuencia** | 4 Hz~18 kHz, +0,5 dB~ −1,5 dB |
| **Selectividad alternada de canal** | |
| **normal ±400 kHz** | 65 dB |
| **Relación de captura** | 1,0 dB |
| **Rechazo de imagen a 98 MHz** | 55 dB |
| **Rechazo de F.I. a 98 MHz** | 90 dB |
| **Rechazo de respuesta espuria a 98 MHz** | 80 dB |
| **Supresión AM** | 55 dB |
| **Separación estereofónica** | |
| **1 kHz** | 50 dB |
| **10 kHz** | 40 dB |
| **Fuga de onda portadora** | |
| **19 kHz** | −65 dB (−70 dB, IHF) |
| **38 kHz** | −45 dB (−50 dB, IHF) |
| **Equilibrio de canales 250 Hz~6 300 Hz** | ±1,0 dB |
| **Punto de límite** | 0,75 $\mu$V |
| **Ancho de banda** | |
| **Amplificador FI** | 180 kHz |
| **Demodulador FM** | 1000 kHz |
| **Bornes de antena** | 75Ω (no equilibrado) |

### ■ SECCION PARA SINTONIZADOR AM

| | |
|---|---|
| **Gama de frecuencias** | |
| **(Para países europeos, Africa del Sur y Australia)** | |
| | 522~1611 kHz (pasos de 9 kHz) |
| | 530~1610 kHz (pasos de 10 kHz) |
| **(Para Arabia Saudita y demás países)** | |
| | 531~1610 kHz (pasos de 9 kHz) |
| | 530~1610 kHz (pasos de 10 kHz) |
| **Sensibilidad (Relación de señal a ruido de 20 dB)** | 20 $\mu$V, 290 $\mu$V/m |
| **Selectividad (±9 kHz)** | 55 dB |
| **Rechazo de imagen a 999 kHz** | 40 dB |
| **Rechazo de F.I. a 999 kHz** | 60 dB |

### ■ GENERAL

| | |
|---|---|
| **Voltaje de salida** | 0,3V (0,6 V IHF) |
| **Consumo de energía** | 9W |
| **Alimentación de energía** | |
| **Para Europa continental** | CA 50 Hz/60 Hz, 220V |
| **Para otros paises** | CA 50 Hz/60 Hz, 110V/127V/220V/240V |
| **Dimensiones (An.×Al.×Prof.)** | 430 × 53 × 245 mm |
| **Peso** | 2,2 kg |

**Nota:**
La distorsión armónica total se mide con el analizador de espectro digital (sistema H.P. 3045).

## ■ MEDICIONES Y AJUSTES

### AM/FM

**Posiciones de control y equipo usado**

- Generador de señales de AM y FM (AM & FM-SG)
- Modulador estéreo
- Analizador de distorsiones
- Osciloscopio
- Voltímetro electrónico de CA y CC (EVM)
- Frecuencímetro
- Bobina de choque (100$\mu$H)
- Resistor (100kΩ)
- Capacitor cerámico (200pF)

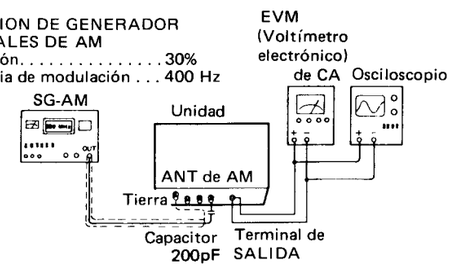
**Nota:** Para **T201** (AM-IFT) y **L203** (bobina OSC AM), se suministran piezas ajustadas. Por lo tanto, no cambie los núcleos de estas piezas.

### AJUSTE DE AM-RF

1. La conexión del equipo de prueba se muestra en la figura.
2. Ajuste la unidad a la posición "AM".
3. Coloque la puesta del indicador de radiofrecuencia y generador de señales a 612 kHz.
4. Ajuste **L202** para salida máxima.
5. Coloque la puesta del indicador de radiofrecuencia y generador de señales a 1503 kHz.
6. Ajuste **CT201** para salida máxima.
7. Repita los pasos 3 ~ 6.

**Nota:** El nivel de entrada de antena ha de ser lo más bajo posible estando libre de AGC (control automático de ganancia).

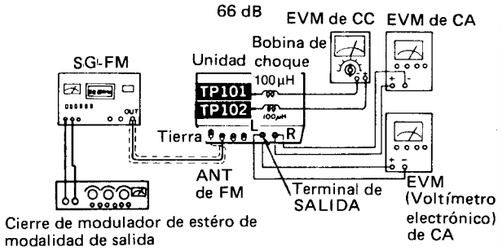
CONDICION DE GENERADOR DE SEÑALES DE AM
Modulación . . . . . 30%
Frecuencia de modulación . . . 400 Hz




### AJUSTE DE DISTORSION MONO FM

1. La conexión del equipo de prueba se muestra en la figura.
2. Ajuste la unidad a la posición "FM".
3. Coloque la puesta del indicador de radiofrecuencia y generador de señales a 100,10 MHz.
4. Ajuste el núcleo de **T101** de manera que el voltaje medido en modalidad de señal sea **0 mV** (0 ± 50 mV).
5. Ponga la modalidad de salida de modulación de estéreo en "I" o "D" minimizado.
7. Repita los pasos 4 ~ 6 y asegúrese de que la distorsión sea casi la misma en los canales "L" y "R" y que sea menos de **4%**.

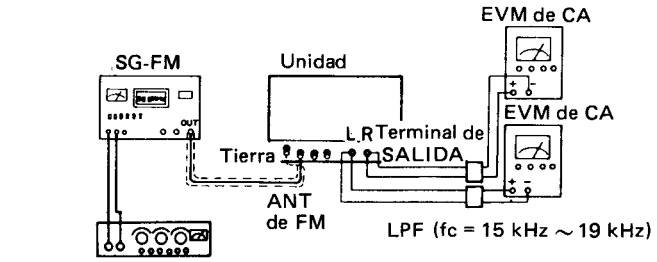
CONDICION DE GENERADOR DE SEÑALES DE FM
Modulación . . . . . 100%
Frecuencia de modulación . . . 400 Hz
66 dB



## AJUSTE DE SEPARACION

1. La conexión del equipo usado se muestra en la figura.
2. Ponga la unidad en la posición "FM".
3. Coloque la puesta del indicador de radiofrecuencia y generador de señales a 100,10 MHz.
4. Ajuste **VR301** de manera que la salida de D quede minimizada cuando el modulador de estéreo esté en la modalidad I (modulación de CH I).
5. La modalidad ha de ser "D" para canal "D"; y la separación de I ⟶ D, D ⟶ I ha de ser **40 dB** por lo menos.

CONDICION DE GENERADOR
DE SEÑALES DE AM
Modulación . . . . . Modalidad de "I" o modalidad de "D" 90%, Piloto 10%
Frecuencia de modulación . . . 1 kHz, Piloto (19 kHz)
66 dB

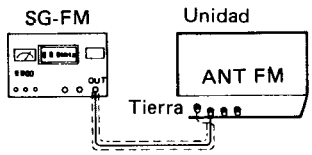


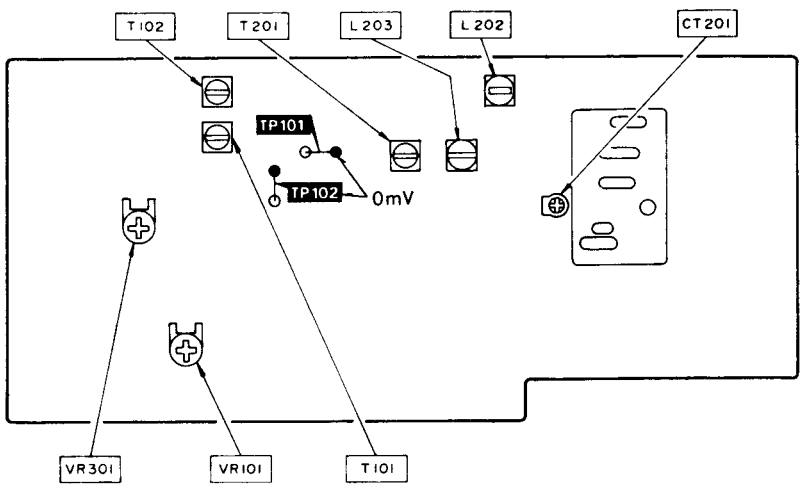

Cierre de modulador de estéreo

## AJUSTE DE NIVEL DE INTENSIDAD DE SEÑAL

1. La conexión del equipo de prueba se muestra en la figura.
2. Ponga la unidad en la posición "FM".
3. Coloque la puesta del indicador de radiofrecuencia y generador de señales a 100,10 MHz.
4. Cambie el indicador LCD de "**frecuencia**" a "**dB**" pulsando el botón de señal de FM.
5. Ajuste **VR101** de manera que se indiquen 54 dB.
6. Asegúrese de que el nivel de intensidad de señal es **22 ~ 38 dB** cuando la entrada sea **30 dB**.

CONDICION DE GENERADOR
DE SEÑALES DE FM
Modulación. . . . . 30%
Frecuencia de modulación. . . 400 Hz
66 dB



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